Chapter 5.
Results of Archaeological Investigations

Land Cultural Resources

Building Envelope

The Building Envelope (BE) is located at the extreme northern end of the Predevelopment, Ltd. property and inland 125 ft (38 m) from the Ordinary High Water Mark (OHWM) shoreline of Lake Erie. Code restrictions on Kelleys Island prohibit the construction of residential buildings within 125 ft of the OHWM; thus, the BE is the only portion of the Predevelopment, Ltd. tract on which a structure can be built. The BE lies at elevations ranging from 577 ft above mean sea level (MSL) at its southern end to 579.5 ft at its northeastern corner (Figure 1-2). The 100-yr open-coast flood for Kelleys Island is 577.5 ft MSL (U.S. Army Corps of Engineers 1977:plate 4), which passes through the southerly one third of the envelope. The BE is an irregular polygon approximately 283 ft (86 m) in length and 70 ft (21 m) in width, with a surface area of 17,800 ft^2 (1,654 m^2) or 0.4 acres (0.16 ha). Construction proposed for the BE is a seasonal lodge of approximately 3,500 ft^2 (325 m^2) and appurtenances, such as an access drive, service building, well, utility lines, and a sewage treatment facility.

The BE is wooded with trees in the 40 to 50 year-old-range, and has a dense herbaceous undergrowth. As such, surface collecting was not practical, necessitating a series of shovel test pits on 10-m square grid (Figure 4-3). Twenty three, 50-cm square pits were dug to the bottom of the A horizon, which in many cases extended down to the shallow bedrock (Figure 2-10). The soils consisted of Castalia very channery silt loam (CcA) and Milton (formerly Lewisburg) silt loam (MnA). The characteristics of the soils at each test pit are given in Table 2-5. Photographs of the Building Envelope study area are contained in Appendix B where they are designated by the prefix BE. The orientation of the photographs is indicated on Figure 4-3.

All but two of the test pits yielded lithic fragments that showed signs of human working, a total of 168 lithic artifacts (Figure 5-1). These fragments all exhibited sharp edges—characteristic of human chipping and not natural breakage. The highest intensity of artifacts corresponded to the Milton soil (Table 2-5). No projectile points or other tools were discovered—only a few possible chert cores and numerous pieces of chert debitage. Table 5-1 contains a description of the chert material obtained from each test pit. After the material was cleaned, each fragment was sorted into one of 8 debitage classes (Table 5-2). The characteristics of these classes are outlined in the methods chapter of this report. Flake fragments and decortication flakes constituted the majority of the recognizable fragments (56%), excluding miscellaneous flakes and core debris.

The chert varies in color from reddish and yellowish brown to gray brown and various shades of gray. The light gray to cream colored material appears to be chert that is innerbedded in the Columbus Limestone which forms the bedrock of most of Kelleys Island. The more colorful materials are likely to be glacial erratics.

Given the absence of complete or partial tools, the site does not appear to be a location where tool making took place. The predominance of check pebbles, core debris and flakes, and decortication flakes (74%), in relation to the relatively small number of flake cores and primary and secondary subcortical flakes (26%), indicates that the site more likely was a place where tool-making materials were obtained. The field and laboratory evidence leads to the conclusion that this area may have been used by prehistoric Indians to explore for and gather usable chert, chipping off flakes to determine the quality of the stone. The site does not appear to merit recommendation for inclusion in the Ohio Archaeological Inventory.

Figure 5-1. Chert debitage recovered from test pit no. C-2 in the Building Envelope (collected May 27, 2004).

TABLE 5-1. LIST OF ARTIFACTS RECOVERED FROM SHOVEL TEST PITS PREDEVELOPMENT, LTD. PROPERTY, BUILDING ENVELOPE LONG POINT, KELLEYS ISLAND, OHIO

Test Pit (Artifact No.)	No. of Items	Artifact Description
A-1 (1-8)	8	Chert debitage, reddish to yellowish brown (range: 2.5-5 cm long, 1.5-3 cm wide).
B-1 (1-7)	7	Chert debitage, reddish to grayish brown (range: 2-3.5 cm long, 1-2.5 cm wide).
C-1 (1-9)	9	Chert debitage, reddish to yellowish brown (range: 2.5-4 cm long, 1-2.3 cm wide).
D-1 (1-15)	15	Chert debitage, reddish to yellowish brown, gray, & cream (range: 1.5-7 cm long, 0.6-5.5 cm wide).
E-1 (1-8)	8	Chert debitage, reddish to light gray brown (range: 2-3.5 cm long, 1.5-2.5 cm wide).
F-1 (1-10)	10	Chert debitage, reddish to yellowish brown, light gray brown (range: 2.5-6.5 cm long, 2-5 cm wide).
G-1 (1)	1	Chert core, gray brown (5 cm long, 4.5 cm wide).
G-1 (2-16)	15	Chert debitage, reddish to yellowish brown, light gray brown, & dark gray (range: 1.5-4.5 cm long, 1-3.5 cm wide).
H-1 (1-10)	10	Chert debitage, yellowish brown, dark gray brown (range: 0.4-2 cm long, 0.5-2.5 cm wide). [2 limestone channery pebbles as examples of this rock type]
I-1 (1-5)	5	Chert debitage, reddish brown, light gray brown, & dark gray brown (range: 1.8-3.5 cm long, 1.5-2.5 cm wide).
C-2 (1-17)	17	Chert debitage, reddish brown, yellowish brown, gray brown (range: 2.5-5.5 cm long, 1-2.5 cm wide).
D-2 (1-10)	10	Chert debitage, reddish brown, light gray brown, & dark gray brown (range: 2-5 cm long, 1-3.5 cm wide).
E-2 (1-4)	4	Chert debitage, reddish brown, gray brown, & medium gray (range: 3-4 cm long, 1-2 cm wide).
F-2 (1-7)	7	Chert debitage, reddish brown, yellowish brown, gray brown (range: 2-4 cm long, 1.5-3 cm wide).
G-2 (1)	1	Chert core, gray brown (4.5 cm long, 3.5 cm wide).
G-2 (2-6)	5	Chert debitage, reddish to yellowish brown, gray brown, & dark gray (range: 2.5-5.5 cm long, 2-2.5 cm wide).
H-2 (1)	1	Chert core, reddish brown (5 cm long, 3.5 cm wide).
H-2 (2-5)	4	Chert debitage, reddish to yellowish brown, gray brown, & dark gray (range: 2-4 cm long, 1.5-2.5 cm wide).
I-2 (1-5)	5	Chert debitage, reddish brown, gray brown (range: 1-3.5 cm long, 0.7-2.5 cm wide).
J-2 (1-5)	5	Chert debitage, reddish brown, dark gray brown (range: 1.5-2.5 cm long, 1-1.7 cm wide).
E-3 (1)	1	Chert debitage, gray brown (2.5 cm long, 1.5 cm wide).
F-3	0	No artifacts. [1 limestone channery cobble as an example of this rock type]
G-3 (1-5)	5	Chert debitage, reddish brown, gray brown (range: 1-3.5 cm long, 0.7-2.5 cm wide).
H-3	0	No artifacts.
I-3 (1-10)	10	Chert debitage, yellowish brown, gray brown (range: 2-5 cm long, 1.3-3.5 cm wide).
I-3 (11-12)	2	Glass fragments, amber, transparent (1.7x1x0.15 cm & 2x1.7x0.15 cm).

5-1. TABLE LIST OF ARTIFACTS RECOVERED FROM SHOVEL TEST PITS PREDEVELOPMENT, LTD. PROPERTY, BUILDING ENVELOPE LONG POINT, KELLEYS ISLAND, OHIO (CONTINUED)

Test Pit (Artifact No.)	No. of Items	Artifact Description
J-3 (1-5)	5	Chert debitage, gray brown, medium gray (range: 2.5-5 cm long, 1.5-3.3 cm wide).
J-3 (6-8)	3	Glass fragments, colorless, transparent (2-3.5 cm long, 1-1.6 cm wide, 0.5 cm thick).
J-3 (9)	1	Glass fragment, amber, transparent (2 cm long, 0.9 cm wide, 0.15 cm thick).

Note:
Field collection May 27, 2004; Laboratory description June 6, 2004.

TABLE 5-2. CHERT DEBITAGE CLASSES FROM SHOVEL TEST PITS, PREDEVELOPMENT, LTD. PROPERTY, BUILDING ENVELOPE LONG POINT, KELLEYS ISLAND, OHIO

Test Pit	Core	CP	FC	CD	FF	DC	PF	SF	M	Total
A-1	0	0	1	1	1	2	3	0	0	8
B-1	0	0	1	0	2	3	1	0	0	7
C-1	0	1	0	0	3	2	2	0	1	9
D-1	0	1	1	1	3	3	2	1	3	15
E-1	0	0	0	1	1	2	1	0	3	8
F-1	0	1	1	1	2	2	2	0	1	10
G-1	1	1	3	2	3	2	3	0	1	16
H-1	0	0	0	0	3	3	1	0	3	10
I-1	0	0	0	2	2	0	1	0	0	5
C-2	0	0	0	3	3	4	4	1	2	17
D-2	0	0	2	2	3	1	0	0	2	10
E-2	0	0	0	0	1	1	0	0	2	4
F-2	0	0	0	1	1	2	1	0	2	7
G-2	1	0	0	0	2	1	0	0	2	6
H-2	1	0	1	1	0	1	0	0	1	5
I-2	0	0	0	1	2	0	0	0	2	5
J-2	0	0	0	0	3	1	0	0	1	5
E-3	0	0	0	0	0	1	0	0	0	1
F-3	0	0	0	0	0	0	0	0	0	0
G-3	0	0	1	0	1	2	0	0	1	5
H-3	0	0	0	0	0	0	0	0	0	0
1-3	0	1	0	2	3	0	0	0	4	10
J-3	0	0	0	1	1	2	0	0	1	5
Total	3	5	11	19	40	35	21	2	32	168

Debitage Classes Legend:

CP—Checked Pebbles
FC—Flake Cores
CD—Core Debris
FF—Flake Fragments
DC—Decortication Flakes
PF—Primary Subcortical Flakes
SF—Secondary Subcortical Flakes
M—Miscellaneous Flakes and Core Debris

LINCOLN HOUSE SITE

The Lincoln House Site consists of the limestone foundation of a ca. 1865 house, an adjacent concrete cistern (ca. 1900), and an isolated concrete cistern (ca. 1910) southwest of the foundation. Kelleys Island resident and historian, William Gorchester, believes the isolated cistern was associated with the Lincoln House (personal communication, June 17, 2004) and the 1874 and 1896 atlases of Kelleys Island show its location to be on property owned by the Lincoln family.

The Lincoln House foundation is located near the center of the Predevelopment, Ltd. property, 530 ft (162 m) northeast of the southern boundary line, and 120 ft (37 m) inland from the Lake Erie shoreline (Figure 4-4). This site has been assigned Ohio Archaeological Inventory No. 33ER521 and an inventory form has been filed with the Ohio Historic Preservation Office. The UTM Zone 17 location of the site is Easting 360150 and Northing 4608680.

The exterior footprint of the foundation encompasses an area of 980 ft^2 (91 m^2) with maximum outside dimensions of 36x31 ft (11x9.5 m). The outline of the foundation is illustrated in Figure 5-2 and the approximate dimension of the various components are listed below:

Component	Dimensions	Area
Interior Space		
West Room	22.5x16.5 ft (6.9x5 m)	371 ft^2 (34.5 m^2)
Room over Cellar	18.0x14.5 ft (5.5x4.4 m)	261 ft^2 (24.2 m^2)
Kitchen (?)	13.0x12.0 ft (4x3.6 m)	156 ft^2 (14.5 m^2)
Landing & Stairwell	12.5x 4.0 ft (3.8x1.2 m)	50 ft^2 (4.6 m^2)
	Interior Total	838 ft^2 (77.8 m^2)
Stoop	5.5x3.5 ft (1.6x1.1 m)	19 ft^2 (1.8 m^2)
Foundation Stone		123 ft^2 (11.4 m^2)
	Total Footprint	980 ft^2 (91 m^2)

Photographs of this site are contained in Appendix C where they are designated by the prefix LH. The orientation of the photographs is indicated on Figure 5-3.

The foundation is constructed of dry-laid limestone slabs, similar to that used to build the Lincoln Stone Wall. The upper course of the foundation consists of about 118 cap stones. The perimeter of the foundation is 136 ft (41.5 m), which yields an average length of 1.2 ft (0.4 m) for the cap stones. There is some variability in the lengths of the cap stones, but they are relatively uniform ranging from about 0.6 ft (0.2 m) to 1.8 ft (0.5 m). The widths of the slabs are fairly uniform at approximately 1.0 to 1.3 ft (0.3 to 0.4 m), but their thickness' are more variable, ranging from less than 0.1 to 0.5 ft (0.03 to 0.15 m). Most of the foundation appears to be only one or two stones deep except for the cellar area. The cellar walls are in remarkable good condition, standing vertical with very little sign of slumping. The floor appears to be unevenly filled with soil and debris (Figure 5-2), but more than 4 ft (1.2 m) of the cellar wall is exposed near the stairwell. Based on the length of the stairwell, which may have accommodated 9 steps, and the rise of each step, 0.7 ft (0.2 m), the cellar height may have been approximately 6.3 ft (1.9 m). The exposed stairs are not the rough stone of the foundation and cellar walls, but appear to be flat, milled stone, underlain with 2 to 3 courses of bricks. Because the soil is shallow at the site, 1 to 2 ft (0.3 to 0.6 m) over limestone bedrock, at least 4 ft (1.2 m) of rock had to be excavated to construct the cellar. As the upper unit of bedrock on the island is composed of thin-bedded slabs, the excavated material may have been used to construct the cellar walls and foundation. The angular nature of this material indicates it most likely did not come from the shore.

Test pits were excavated at 15 locations (Figure 5-3) within and surrounding the foundation. These pits yielded a total of 459 artifacts that are descripted in Table 5-3.

The entrance to the house appears to have been on the southeast corner, where the remnants of a stoop and landing can be seen (Figure 5-2). The small room immediately to the west of the landing and stairwell may have been the kitchen based on the recovery of cooking utensils, dishware, and a stove damper from test pits L-11 and L-12 (Table 5-3 and Figures 5-3 and 5-4). A considerable amount of ash was also found in these test pits. The large room to the west of the kitchen also yielded ash and burned limestone at test pit L-6, which may have been associated with a hearth in that area. Ash was not detected in any of the other test pits. This was somewhat surprising in that Pape (1988) reported that the Lincoln House burned in 1917. The

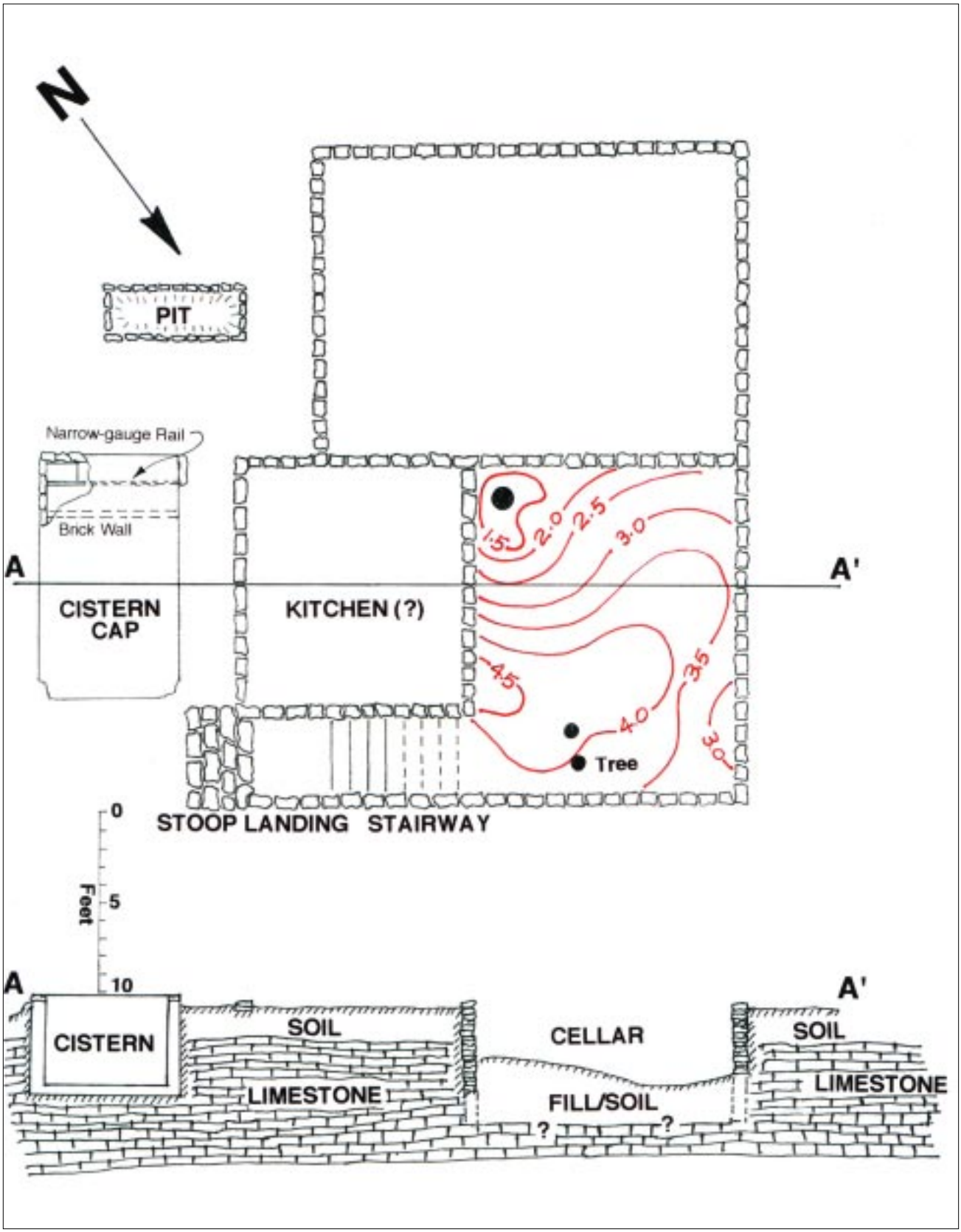

Figure 5-2. Site plan and cross-section of Lincoln House foundation and cistern (33ER521). Red contour lines indicate depth below ground surface (feet) in the cellar area.

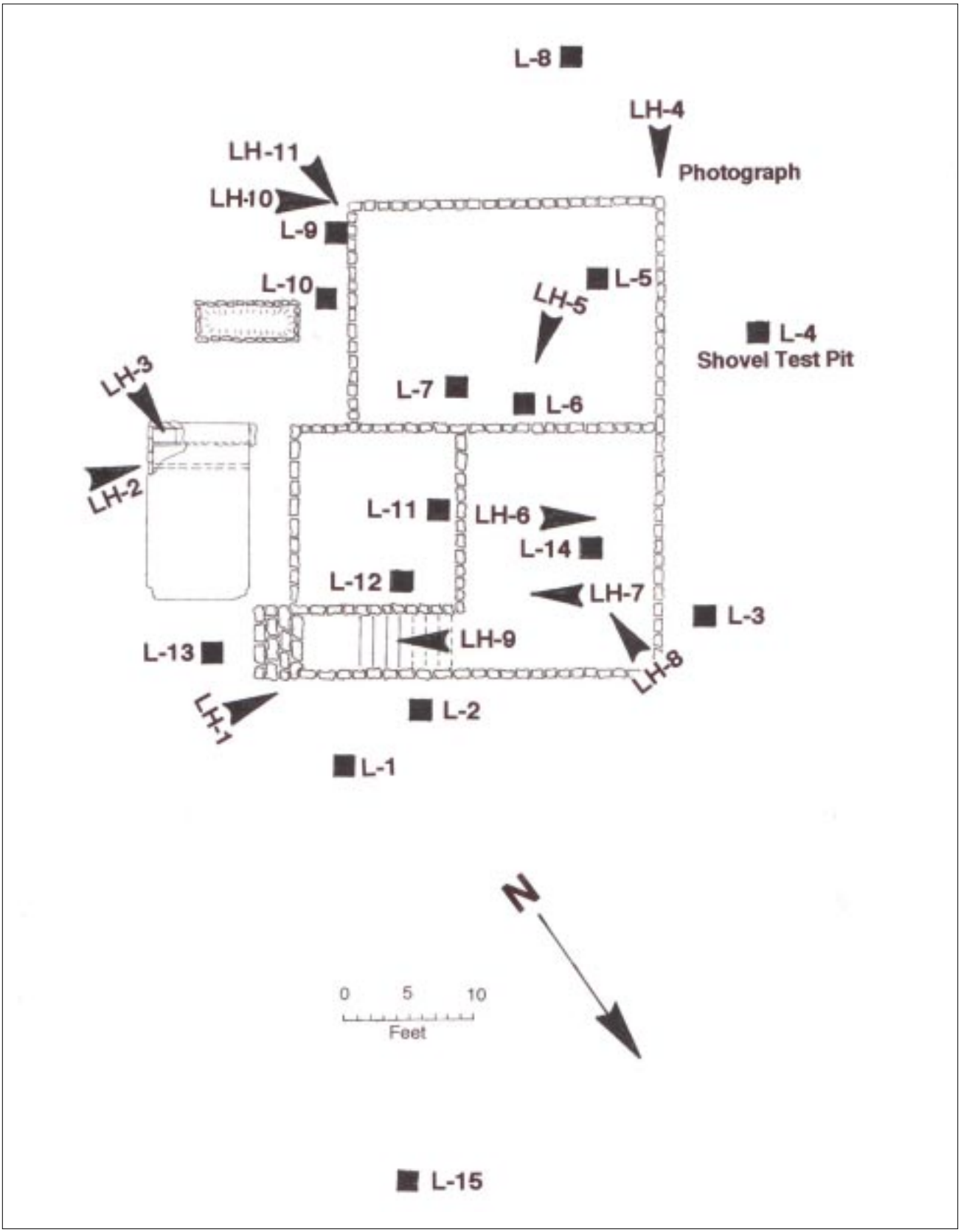

Figure 5-3. Site map of Lincoln House foundation, showing the location of shovel test pits and Appendix C photographs.

TABLE 5-3. LIST OF ARTIFACTS RECOVERED FROM SHOVEL TEST PITS IN THE VICINITY OF THE LINCOLN HOUSE FOUNDATION, PREDEVELOPMENT, LTD. PROPERTY, KELLEYS ISLAND, OHIO

Test Pit (Artifact No.)	No. of Items	Artifact Description
L-1 (1)	1	Metal strap (54 cm long, 17 cm wide, 0.4 cm thick) with a series of 5 holes (center hole 0.8 cm diameter, others 0.4 cm) & an oval metal ring (6x4.5 cm) attached by a metal pin to one of the outer holes; rectangular, connection loops at each end of strap.
L-1 (2-6)	5	Square nails, range 4-7.5 cm in length.
L-1 (7)	1	Metal fragment; corner of a metal object with recessed interior (5x3.6 cm).
L-1 (8-9)	2	Metal fragments of a cylindrical fluid container; top & base (6.5 cm diameter).
L-1 (10)	1	Round nail, lower end (4.7 cm long).
L-1 (11-12)	2	Metal fragments, small (2-4 cm long).
L-1 (13-15)	3	Ceramic fragments; pieces of a white plate (?) with gray floral design (4-9 cm long, 0.4 cm thick).
L-1 (16-17)	2	Ceramic fragments; pieces of a white china dish (?) with gold edge trim & delicate green leaf pattern (3.5-8 cm long).
L-1 (18)	1	Glass fragment, colorless, transparent (2.4x1.7x0.4 cm).
L-1 (19)	1	Brick, reddish-brown (20x9.5x5.7 cm), recessed top surface (15x3.5x0.4 cm); appears modern (found at surface).
L-2 (1-2)	2	Glass fragments, colorless, transparent (5.5x2x0.3 cm & 3.5x2x0.2 cm).
L-2 (3-8)	6	Square nails (6.4 cm long, head 0.55 cm, shank 0.4 cm).
L-2 (9-11)	3	Square nails (3.8 cm long, head 0.4 cm, shank 0.3 cm).
L-2 (12-18	7	Round nails, 4d (3.6 cm) & 2d (2.8 cm).
L-2 (19)	1	Coiled spring with hooked end (4.8 cm long & 0.2 wire diameter).
L-2 (20-28)	9	Ceramic fragments, possibly from a single plate; deep blue blending to dark gray (2.5-12 cm long).
L-3 (1)	1	Metal strap (?), thin, broken at ends (5.5x3.7x0.1 cm).
L-3 (2-3)	2	Glass fragments, colorless, transparent; 20° angular bend (2.5 & 4 cm long & 0.4 cm thick).
L-3 (4-8)	5	Square nails (1, headless 7.2 cm; 2, 6.4 cm; 1, 3.9 cm; 1, 2.9 cm).
L-3 (9-22)	14	Round nails (2, 8d common nails; 1, 8d finish nail; 11, 4d common nails).
L-4 (1-2)	2	Glass fragments, colorless, transparent (2.2 & 2.3 cm long & 0.2 cm thick).
L-4 (3)	1	Metal angle iron (each arm 12.5x2.8x0.4 cm); one arm a round hole (0.7 cm diameter & other has similar hole & a square hole (0.7 cm diameter).
L-4 (4)	1	Ceramic fragment, slightly curved (3.4x2.9x0.6 cm).
L-5 (1)	1	Brick, reddish-brown, slightly distorted (18.5x9.5x5 cm); appears old style (found partially exposed).

TABLE 5-3. LIST OF ARTIFACTS RECOVERED FROM SHOVEL TEST PITS IN THE VICINITY OF THE LINCOLN HOUSE FOUNDATION, PREDEVELOPMENT, LTD. PROPERTY, KELLEYS ISLAND, OHIO (CONTINUED)

Test Pit (Artifact No.)	No. of Items	Artifact Description
L-5-(2)	1	Fish net float, metal, cylindrical can sealed at ends (25 cm long, 7.7 cm diameter); eight circular indentations along the length of the can (0.8 cm wide & 0.3 cm deep, center two indentations 1.3 cm apart, others 0.3 separation.
L-5 (3-5)	3	Ceramic fragments, grayish-white (9, 11 &12 cm long & 0.5 cm thick); appears to be a lid to a container with a ~26 cm diameter; ~35% of perimeter found.
L-5 (6)	1	Ceramic fragment, white (11 cm long & 0.7 cm thick); appears to be the base of a dish or container; partial inscription on underside, "WAR..." above a crown-shaped crest.
L-5 (7-17)	11	Square nails (2, 7.5 cm; 8, 6.2 cm; 1, 3.4 cm).
L-5 (18-20)	3	Round nails, roofing style (4-4.5 cm long).
L-6 (1)	1	Sample of ash & burned limestone pebbles; ash formed a coating on metal & glass objects recovered from test pit.
L-6 (2-19)	18	Square nails (10, 6.4-7.2 cm; 8, 3.8 cm).
L-6 (20-23)	4	Round nails, 4d common nails (4 cm).
L-6 (24-25)	2	Glass fragments, colorless, transparent (2.5 & 3 cm long & 0.3 cm thick); distorted, partially melted appearance.
L-6 (26)	1	Land snail shell, coiled (2.4 cm diameter); *Trodopsis albolabris*.
L-7 (1-6)	6	Square nails (1, 7.2 cm; 3, 6.4 cm; 2, 3.4 cm, broken with heads).
L-7 (7-14)	8	Nail fragments, no heads, square shanks (0.7-6 cm long).
L-7 (15)	1	Circular metal base, half (13 cm diameter, raised to 3 cm in the center with 2.3 cm diameter hole at top center); flat flange at outside edge (1.5 cm wide); possibly base for a lamp.
L-7 (16-17)	2	Glass fragments, aquamarine, transparent (2.9 & 3.5 cm long & 0.2 cm thick); melted appearance.
L-8	0	No artifacts.
L-9 (1-11)	11	Square nails (1, 7.6 cm; 10, 6.4 cm).
L-9 (12)	1	Metal cap from a shot-gun shell, inscription on base, "NO. 16 J.C.HIGGINS XTRA RANGE" (2 cm diameter).
L-9 (13-19)	7	Brick, reddish-brown, small fragments (1.7-3.5 cm long, 0.3-0.5 cm thick).
L-10 (1-3)	3	Hog (?) leg bones, femur (6 cm long, 2.5 cm wide & thick) & a small socket bone (2x1.4 cm).

TABLE 5-3. LIST OF ARTIFACTS RECOVERED FROM SHOVEL TEST PITS IN THE VICINITY OF THE LINCOLN HOUSE FOUNDATION, PREDEVELOPMENT, LTD. PROPERTY, KELLEYS ISLAND, OHIO (CONTINUED)

Test Pit (Artifact No.)	No. of Items	Artifact Description
L-10 (4-25)	22	Square nails (1, 10.2 cm long, 1.0 cm head, shank 0.8x0.4 cm; 1, 7.4 cm; 16, 6.5 cm; 4, 2-4 cm, fragments).
L-10 (26-78)	53	Glass fragments, aquamarine, transparent (1-7 cm long & 0.2 cm thick); most show signs of partial melting, some fused together.
L-10 (79)	1	Glass fragments, colorless, transparent (5.9 cm long, 1.5 cm wide & 0.3 cm thick); right angle bend.
L-10 (80)	1	Metal wall hook; ornate, curved design; base (5x0.8x0.4 cm); hook (6 cm outward extension, 0.4 cm thick).
L-11 (1-15)	15	Charcoal fragments, black (0.7-1.8 cm long); associated with ash soil & burned limestone pebbles.
L-11 (16-29)	14	Square nails (3, 7.4 cm; 4, 6.4 cm; 2, 3.4 cm; 5 nail fragments, 1.8-3.0 cm).
L-11 (30)	1	Glass fragment, olive green, melted (2 cm long, 0.4 cm thick).
L-12 (1)	1	Sample of ash & burned limestone pebbles.
L-12 (2-7)	6	Glass fragments, 3 colorless, 3 pale yellow, melted (2-4.5 cm).
L-12 (8-17)	10	Metal fragments, curved (2.5-4 cm); possibly rim of a container.
L-12 (18-26)	9	Square nails (1, 11.3 cm; 5, 7.4 cm; 1, 5.5 cm, broken; 2, 4 cm).
L-12 (27)	1	Spoon, metal, bowl & half of stem, brass colored; ornate design on stem.
L-12 (28)	1	Stone damper, cast iron (14.5 cm diameter), pin (20 cm long) with eye ring at one end (3 cm diameter); melted glass adhered to damper plate.
L-12 (29-40)	12	Ceramic fragments, white with flower & leaf design (1.4-6.5 cm long, 0.4 cm thick); bowl (?).
L-12 (41)	1	Biscuit baking pan (?), cast iron (35 cm long, 17 cm wide, 0.3 cm thick); 11 oval compartments (8x5.5 cm), 2 broken off with a portion of a handle (recovered); broken handle with raised letters “FERMAN” above “...USTON” & “PAT...” on attached handle; melted pale yellow glass in center compartment.
L-12 (42-126)	85	Earthenware plate(s) fragments, heavy, white blending to bluish-gray (1-12 cm long, 0.7 cm thick).
L-13 (1-18)	18	Earthenware crock, jug, or bowl (?) fragments, heavy, dark brown to olive green & gray (2-7 cm long, 0.5-0.6 cm thick); one piece is a rim (12 cm diameter opening), widened below; another piece is a base (11 cm diameter).
L-13 (19)	1	Ceramic bowl fragment (16 cm diameter, fragment 12 cm long, 0.4 cm thick), white, curved.
L-13 (20)	1	Ceramic container fragment (7 cm diameter, fragment 6.3 cm long, 0.5 cm thick), white, curved.
L-13 (21-34)	14	Round nails, 2d & 4 d (4-10.3 cm).
L-13 (35)	1	Screw, flathead (3.2 cm long).

TABLE 5-3. LIST OF ARTIFACTS RECOVERED FROM SHOVEL TEST PITS IN THE VICINITY OF THE LINCOLN HOUSE FOUNDATION, PREDEVELOPMENT, LTD. PROPERTY, KELLEYS ISLAND, OHIO (CONTINUED)

Test Pit (Artifact No.)	No. of Items	Artifact Description
L-13 (36)	1	Metal strip (14x2x0.15 cm), broken at ends; 2 holes with rivets (0.2 cm diameter); top edge finished, lower edge broken.
L-14 (1-5)	5	Ceramic bowl fragments (15 cm diameter), plain white, name on underside "McNICOL CHINA CLARKESBURG, W. Va."; pieces of 5 individual bowls.
L-14 (6)	1	Handle, door or drawer, cast iron (18 cm long, 2 cm wide, 0.5 cm thick); attachment plate at each side of handle grip (5x4 cm) with club-shaped ends & 4 holes each (3 round, 0.6 cm diameter & 1 rectangular, 1.5x1 cm).
L-14 (7)	1	Container top, metal, thin, rectangular (13.5x10x0.1 cm) with circular hole in center (5.5 cm diameter).
L-14 (8)	1	Coal, thin lump, black, bituminous (6.5x6x1 cm).
L-14 (9-10)	2	Bottle fragment, base (10x4x0.3 cm), dark amber, whiskey (?); raised letters on backside, "FEDERAL LAW FORBIDS SALE OR REUSE OF THIS BOTTLE" & on bottom, "L-8999 0-126 64 61"; separate fragment that fits into base (5.5x1.8x0.3 cm).
L-14 (11-12)	2	Jar rim fragment (13 cm diameter), colorless, transparent, ridges for a screw lid (12 cm long & 0.5 cm thick); small fragment of same material (2 cm long).
L-14 (13)	1	Burned limestone (?), reddish-brown (6.5x5x1.5 cm).
L-14 (14)	1	Metal fragment, bent to form an interior right angle (8x4x0.1 cm).
L-14 (15)	1	Lower jaw bone (mandible) of a coyote (*Canis latrans*) with incisor, canine, premolar, & molar teeth (13x2.5x1 cm).
L-14 (16)	1	Rostrum and premaxillary bone of skull of a coyote (*Canis latrans*) with incisor, canine, premolar, & molar teeth (5.5x4.5x0.5 cm); appears to be from same animal as L-14 (15).
L-15 (1-4)	4	Square nails (7.4 cm), one missing head.
L-15 (5-8)	4	Glass fragments, flat, light blue tint (5.5-9.4 cm long, 0.2 cm thick).
L-15 (9-10)	2	Glass fragments, container (?), curved, medium turquoise blue tint (6 & 8 cm long, 0.5 cm thick).
L-15 (11)	1	Glass fragment, apple green, transparent, semi-circular form (5 cm across, 0.2 cm thick).
L-15 (12-13)	2	Ceramic fragments, small bowl, white exterior with transparent yellow decoration & pink interior (8 cm diameter base, 0.4 cm thick).
L-15 (14)	1	Rubber pad (3.5x2.3x0.15 cm), deteriorated, black.
L-15 (15)	1	Metal can lid (15.5 cm diameter, rim 0.4 cm thick).
L-15 (16)	1	Glass fragment, colorless, transparent (2.0 cm long, 0.2 cm thick).

Note:
Field collection May 29, 2004; Laboratory description June 6, 2004.

Figure 5-4. Kitchenware artifacts recovered from test pit no. L-12 at the Lincoln House Site, 33ER521; dimensions of baking pan at right center: 35 cm long, 17 cm wide, 0.3 cm thick (collected May 29, 2004).

fact that a large number of nails were found in most of the test pits suggests that the burned frame, flooring, and siding may have deteriorated to the point where only the fasteners remain, but the more deep seated ash in sumps from cooking or heating fires may persist.

The exterior design of the Lincoln House is unknown, but by the placement of the cellar stairwell, a complimentary stairway leading to a second floor can be envisioned. Based on the complete loss of the house in the 1917 fire, and the absence of any other construction material at the site, the house was most likely wood framed with wood siding and shingles. Some melted glass was recovered from the test pits, especially in the possible kitchen area, but few that resembled window glass. The occurrence of considerable dishware immediately east of the stoop, at test pit L-13, suggests that this area may have been used as a summer kitchen or trash pit.

External to the house, but very near the kitchen and stoop lies a sizeable cistern and a shallow stone-lined pit (Figure 5-2). The cistern cap, 13.6x9.3 ft (4.1x2.8 m), is constructed of concrete, using narrow-gauge railway rails as reinforcing bars that run the width of the top. The cap is nearly flush with the adjacent ground level to 0.5 ft (0.15 m) above. The water-holding chamber is 4.3 ft (1.3 m) deep and also constructed of concrete with an interior brick wall. Because narrow-gauge railways were not constructed on Kelleys Island until 1888 (Myers et al. 1992:29), the cistern most likely postdates the house by some 30-35 years. By the early 1900s scrap rails may have been available for such purposes. The cap is broken on the edges, and one sizeable piece is dislodged at the south corner, which permits a view of the cistern's interior.

The shallow stone-lined pit, is trough-shaped with a more or less rounded bottom. Its dimensions are 7.9x3 ft (2.4x0.9 m) and 1.5 ft (0.5 m) deep. The utility of the pit is unknown, but it may have served as storage for produce or contain a trough for watering livestock.

The second cistern was discovered approximately 235 ft (72 m) southwest of the house foundation in an isolated location about 50 ft (15 m) southeast of the access drive (Figure 4-4). The dimensions of this cistern are 13.9x7.8 ft (4.2x2.3 m) and 4.5 ft (1.4 m) deep. Like the cistern near the house foundation, this one is also constructed of concrete and the cap is reinforced with 6 narrow-gauge railway rails (Figure 5-5) which run the width of the top at relatively uniform intervals of about 1.8 to 2 ft (0.5 to 0.6 m). Unlike the other cistern, the isolated one was not set in the ground, but most likely perched on the bedrock surface (Figure 5-5). A date of "1910" is neatly etched into the top of the cap near the southwest corner. The entire cistern is enclosed by a wall constructed of dry-laid limestone slabs, very similar to the material and dimensions of the Lincoln Stone Wall. The wall is 20x14 ft (6x4.3 m) and probably 2.5 to 3 ft (0.8 to 0.9 m) high, but most of its height is obscured by fill. Test pits excavated on each side of the cistern yielded no significant artifacts (Table 5-4). Photographs of this site are contained in Appendix C where they are designated by the prefix IC. The orientation of the photographs is indicated on Figure 5-5.

The Lincoln House was constructed ca. 1865, soon after the builder (Joseph Lincoln) came to the island and married a daughter of John Titus. Pape (1988) reports that the Lincolns had a prosperous farm on Long Point, despite the thin soil, where they raised grapes, apples, and cows. The 1874 atlas of Kelleys Island (Figure 5-6) shows the location of the orchards and vineyards on Long Point in relation to the Lincoln House, as well as the James Watkins House (33ER499) farther toward the tip of the point. Oral histories from island residents indicate that the Lincolns had to blast holes into the rock to plant the apple trees and that the family sold milk and butter for additional income (Pape 1988). The 1896 atlas of Kelleys Island (Figure 5-7) indicates that Mason Lincoln (Joseph's son) had purchased his uncle's farm (James Watkins), which extended from his father's farm to the tip of Long Point. In 1917 the Lincoln House burned to the ground, but the 140-year-old foundation walls, as well as the Lincoln Stone wall, are testimony to the skill and precision of construction in these durable features of the Kelleys Island landscape. Today the cellar walls are home to the federally threatened Lake Erie watersnake, where in 2003 a female produced some 20, liveborn young (personal communication, Kristin Stanford, Northern Illinois University Research Associate, June 26, 2004).

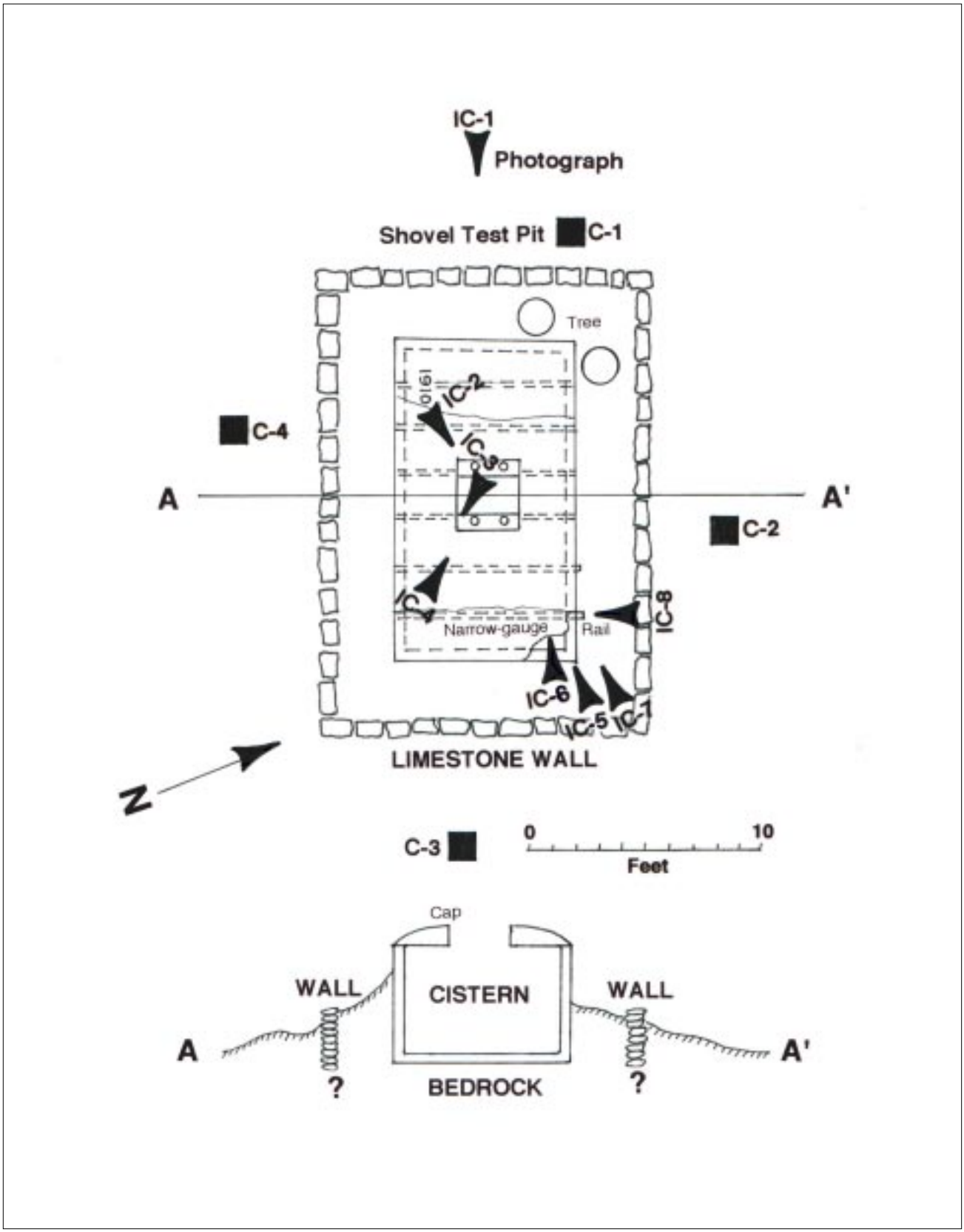

Figure 5-5. Site plan and cross-section of isolated cistern southwest of the Lincoln House foundation, showing location of shovel test pits and Appendix C photographs.

TABLE 5-4. LIST OF ARTIFACTS RECOVERED FROM SHOVEL TEST PITS IN THE VICINITY OF AN ISOLATED CISTERN AT EASTERN EDGE OF PREDEVELOPMENT, LTD. PROPERTY, KELLEYS ISLAND, OHIO

Test Pit (Artifact No.)	No. of Items	Artifact Description
C-1 (1-2)	2	Metal rim of a container (?), rolled edge, flattened (23 cm long), oval rim (1.5 cm wide); broken into 2 parts.
C-2	0	No artifacts.
C-3 (1)	1	Field tile fragment, curved (6x3.6x1.3 cm).
C-4	0	No artifacts.

Note:
Field collection May 29, 2004; Laboratory description June 6, 2004.

LINCOLN STONE WALL

The Lincoln Stone Wall or Long Point Stone Wall (ERI-1664) was first documented in 1985 (Pape 1988). This 3,600-ft-long (1,100-m) limestone fence was built ca. 1865 along the east (inland) side of Monagan Road approximately 50 to 100 ft (15 to 30 m) inland from the Long Point lakeshore (Figure 4-4). The wall begins at the point where the north-south segment of Monagan Road reaches the lakeshore and turns northeast along Long Point (Figure 5-8). The wall presently terminates about 2,300 ft (700 m) south of the tip of Long Point. Pape indicates that it may have extended all the way to the end of the point, but this seems unlikely based on an inspection of the area. The wall originally traversed the property owned by Samuel Hamilton and Joseph Lincoln. The Hamilton family acquired the land in 1851 followed by Lincoln in 1865. Samuel's son James Hamilton settled on the island's North Bay in 1839, and was one of the first to purchase land from the Kelleys. James' favorable report from the island encouraged his parents to purchase a tract near the base of Long Point, just north of his own land. James Hamilton and Joseph Lincoln were brothers-in-law, both having married daughters of John Titus (Hills 1925). Oral histories (Pape 1988) indicate that the wall was started by Joseph Lincoln who utilized stone that was cleared from his fields; his son, Mason, also contributed to the wall as did the Hamiltons, his neighbors to the southwest (Figures 5-6 and 5-7).

The wall is composed of dry-laid, tabular limestone slabs, interspersed with occasional glacial boulders (rounded igneous and metamorphic erratics). On the former Hamilton property at the southern end, the slabs are noticeably smaller than farther to the north on the Lincoln property; the former requiring over 25 courses of stone, while the later reaches a similar height of about 3.3 ft (1 m) in 15 to 20 courses. The wall averages about 1.6 (0.5 m) in width and is typically capped with a top course of larger and more irregularly shaped stone. The slanted upper course of rocks found at other stone walls on the island was not observed at the Lincoln Stone Wall. The thicknesses of the lower courses range from about 1.5 in (4 cm) to 6 in (15 cm). The material used to construct the wall is angular to sub-rounded, suggesting two sources. The angular rock resembles the thin-bedded upper sequence of Columbus Limestone, which is described in the geology section of this report, while the more rounded material appears to be from the same geologic formation, but has been exposed to wave action along the shoreline. The storm berms which ring much of Long Point seem a likely source of the sub-rounded rocks.

A number of gaps occur in the wall, some may be original while others have been caused by later construction. Between the southern terminus of the wall and the Predevelopment, Ltd. property, particularly in the vicinity of Camp Patmos, the missing sections appear to be related to activities in the mid-20th century. Within the Predevelopment, Ltd. tract, the wall extends from the southern boundary for some 726 ft (221 m) to the northeast, following the contour of the shoreline about 65 ft (20 m) from the water's edge.

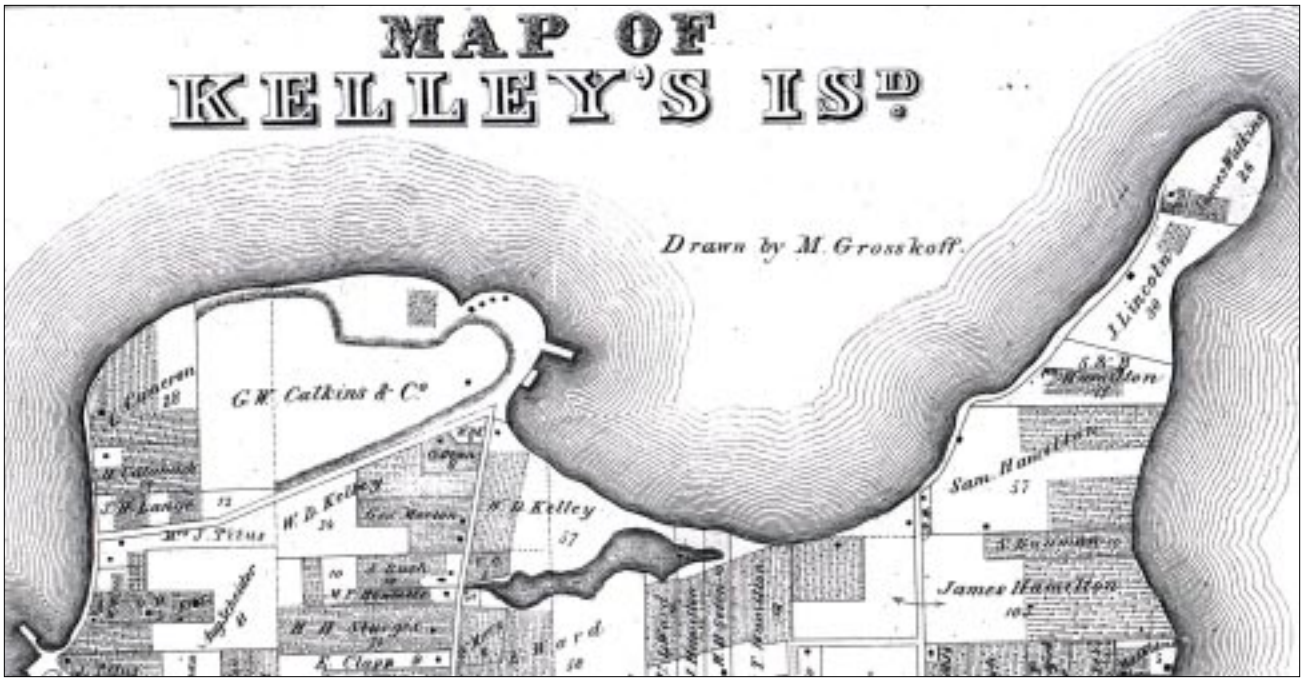

Figure 5-6. Northern half of Kelleys Island in 1874 from Erie County, Ohio Atlas, showing location of Lincoln property on Long Point (Stewart and Page 1874).

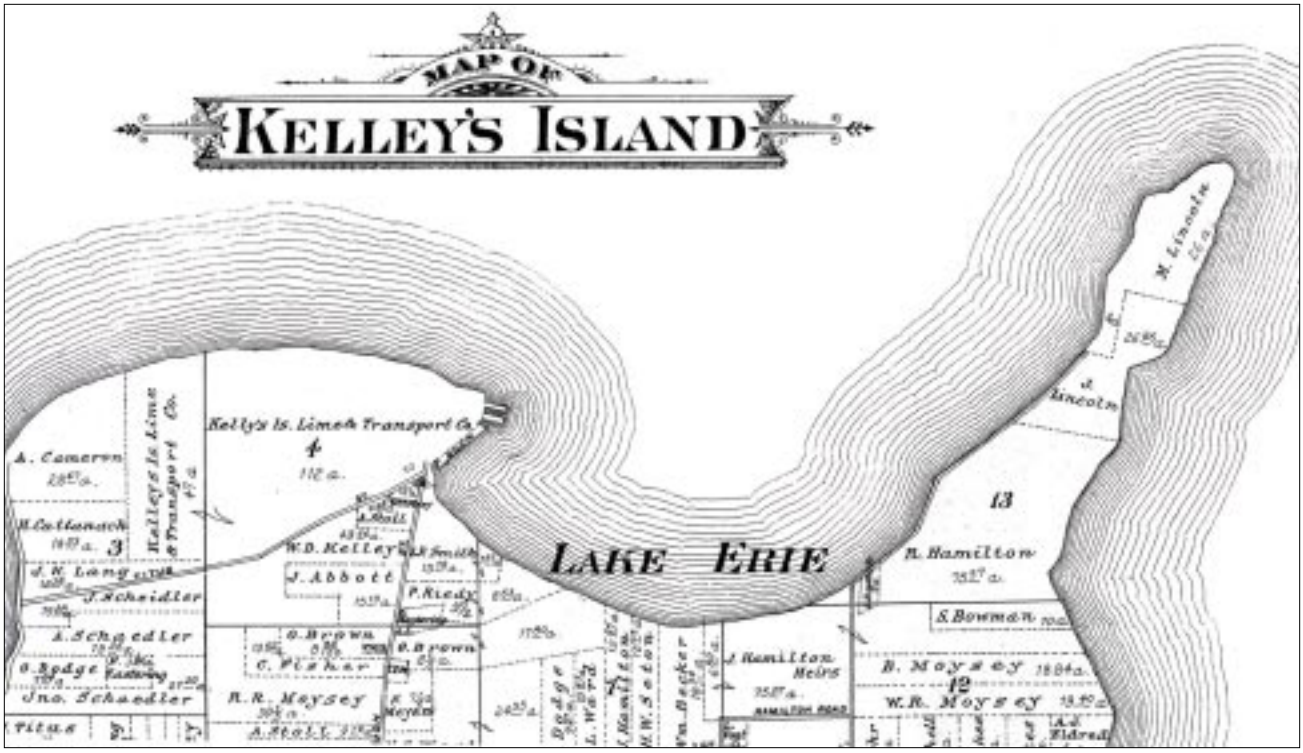

Figure 5-7. Northern half of Kelleys Island in 1896 from Erie County, Ohio Atlas, showing location of Lincoln property on Long Point (Atlas Publishing Co. 1896).

The abandoned section of Monagan Road lies between the wall and the lakeshore about 6 ft (2 m) from the wall (Figure 5-8). Two gaps in the wall occur on the Predevelopment, Ltd. tract, a 9 ft (2.7 m) opening at 309 ft (94 m) northeast of the southern property line, and an 88 ft (27 m) gap 139 ft (42 m) farther up the line. Beyond this gap, the wall extends another 181 ft (55 m) to the northeast before ending abruptly in a woodlot. The larger gap may have been associated with lake access for the Lincoln House (33ER521), the foundation of which is located 50 ft (15 m) inland from the opening, while the smaller gap may have served a similar purpose for the isolated cistern located about 100 ft (30 m) inland of this opening (Figure 4-4). Neither of these openings appears to be recent. Another gap in the wall, 93 ft (28 m) to the south of the property line on land owned by the Cleveland Museum of Natural History, also appears to be original in that the 24-ft (7.3-m) opening has a 13-ft (4-m) return wall to the southeast on the northern side of the opening. The extant sections of the wall on Predevelopment, Ltd. property are in reasonably good condition with only a few locations where it shows signs of collapse. Photographs of the Lincoln Stone Wall are contained in Appendix C where they are designated by the prefix LW. The orientation of the photographs is indicated on Figure 4-4.

Submerged Cultural Resources

The submerged cultural resources described in this report include those that lie lakeward of the Ordinary High Water Mark (OHWM) for Lake Erie to a distance of 300 ft (90 m) along the Predevelopment, Ltd. property on the northwest shore of Long Point, Kelleys Island, Ohio (Plate 1). This area was investigated by several methods as described in the methods chapter of this report. OHWM for Lake Erie is set by the U.S. Army Corps of Engineers at an elevation of 573.4 ft (174.77 m), IGLD, 1985. Low Water Datum (LWD) for Lake Erie, the datum plane used for NOAA navigational charts is 569.2 ft (173.49 m), IGLD 1985, or 4.2 ft (1.28 m) below OHWM. During the diver survey of the transect lines (Figure 4-5), the water level of Lake Erie was 571.9 ft (174.32 m), or 1.5 ft (0.46 m) below OHWM (Figure 4-6).

Figure 5-8. Lincoln Stone Wall (ERI-1664) near its southern extremity, about 2,900 ft (880 m) southwest of the Predevelopment, Ltd. tract (May 29, 2004).

As the lakefloor was being investigated for submerged cultural resources, the character of the shore material and lake bottom was also recorded (Tables 2-3 and 2-4). For the southern half of the study area, Figure 2-6 shows that most of the shoreline consists of limestone bedrock, followed by beds of cobbles and boulders, which in turn is followed by sand beds, progressing in an offshore direction. In the northern half of the area investigated, either bedrock or cobbles/boulders formed the bottom to the offshore limit. Photographs of the shoreline are contained in Appendix D and designated by the prefix SH; orientation of the photographs is indicated on Figure 4-5.

Other than 2 previously documented shipwrecks which lie along Transect B (steambarge *ADVENTURE*, 33ER481) and transect C (scow schooner *W. R. HANNA*, 33ER488), no other cultural resources were discovered submerged within the study area. Descriptions of these 2 shipwrecks are contained in the following sections of this chapter in order to provide a context for the analysis and discussion of potential effects that the proposed boat docking facility may have on these sites.

The only other feature documented in this phase of the investigation is the derelict hull of a relatively modern motorboat (Figure 5-9). The hull is located just below OHWM on a sandy beach composed primarily of fragmented zebra mussel shells, in the vicinity of transect K. The boat is of wood frame construction supporting a fiberglass hull, moulded in a "V" configuration. The transom and upper portion of the hull are missing. The extant hull is white in color and has a length of 14.7 ft (4.5 m) and a beam of 6 ft (1.8 m). The interior bow area is covered with a maroon-colored carpet. Built less than 50 years ago, and being in very poor condition, this watercraft has no significant historic value. Without the identification number that would have been located on the missing upper bow hull, little can be learned about its history. The orientation of the photographs of the hull in Figure 5-9 is indicated on Figure 4-5 where they are designated by the prefix BW.

SIDE-SCAN SONAR SURVEY

On July 6, 2004 a reanalysis of the side-scan sonar data from Long Point was conducted at the Sandusky, Ohio office of the Ohio Division of Geological Survey. Side-scan images were obtained in an August 2003 survey in which the author participated with staff members of the Lake Erie Geology Section (Figure 5-10). A Klein Associates Model 595 side-scan sonar system was used to image the lake floor, interfaced with a Trimble Model 212 differentially corrected GPS for sub-meter positioning, which was in turn interfaced with a Triton Isis data acquisition system (Figure 4-9).

On August 13, 2003 the nearshore lake bottom from the vicinity of the *W. R. HANNA* shipwreck site (33ER488) north along the entire Predevelopment, Ltd. shoreline, and then returning south to the shipwreck site, was imaged from the Division's research vessel *GS-3* (Figure 4-8). The vessel operated approximately 200 ft (60 m) offshore with the sonar unit set to scan a 260 ft (80 m) wide swath on either side of the vessel. At this setting, the shoreline as well as the *W. R. HANNA* were identified in the scan images. The purpose of the survey was to search for and document historic shipwrecks within the proposed Kelleys Island Shipwreck Preserve (Figure 4-1).

The reanalysis confirmed that no submerged shipwrecks were present within at least 400 ft (120 m) of the shore along the Predevelopment, Ltd. property, with the exception of the known historic shipwrecks (*ADVENTURE* and *W. R. HANNA*). Exploration for the reported site of the sidewheel steamer *ST. LOUIS* on Kelleys Island Shoal also proved negative as well as wrecks reported for Gull Island Shoal. However, the positions of 4 other shipwrecks off the east, south, and west shores of Kelleys Island were documented (*F. H. PRINCE*, *EXCHANGE*, *RELIEF*, and *C. H. PLUMMER*).

STEAMBARGE *ADVENTURE*

Stone quarries on Kelleys Island date back to around 1830. For over a century they yielded high-quality limestone. The stone left the island in several forms: building stone for coastal construction projects, flux stone for steel mills, and burned stone for agricultural lime and other lime products. Eventually Kelleys Island became the largest producer of lime in the world (Myers et al. 1992:21). Virtually all of these stone products were transported from the island by merchant steamers and sailing vessels. One of these vessels, the steamer *ADVENTURE*, met a disastrous end in 1903 while engaged in this trade. The remains of this shipwreck in the North Bay of Kelleys Island provide insight into the maritime aspects of the lime industry during its heyday (Figure 5-11).

Figure 5-9. Derelict hull of the fiberglass motorboat located on the beach about 12 ft (3.6 m) northeast of transect K (June 28, 2004).

Archaeological investigations of this shipwreck were undertaken as part of a nautical archaeology workshop offered at Firelands College of Bowling Green State University in September and October 1997. The workshop, *Shipwreck Archaeology for Recreational Divers*, was organized by the Ohio Submerged Lands Advisory Council, an advisory body to the Ohio Department of Natural Resources and the Ohio Historical Society, charged with managing the cultural resources in Lake Erie. Results of the investigations were reported by Labadie and Herdendorf (1998, 2004a) and Herdendorf et al. (2002) and are summarized here. The *ADVENTURE* Site (33ER481) is located at N41°37.085', W82°40.867'.

HISTORICAL DOCUMENTATION

The *ADVENTURE* was built in 1875 at Detroit, Michigan by well-known shipbuilder John Oades. She was a conventional two-masted schooner with straight stem and a square transom stern (Figure 5-12). Like hundreds of her contemporaries, she was fitted with topmasts, a long bowsprit, and a centerboard, and she undoubtedly carried foresail and main, two gaff topsails, a forestaysail, and two or three foresails or "jibs" (Kihlberg 1963:74,75). She may also have used the triangular "raffee" on her foremast which was the characteristic of many lakes sailing craft of her era. Her crew would have consisted of three or four men and a cook.

The *ADVENTURE* measured 104.0 ft (31.7 m) in length, 24.0 ft (7.3 m) beam (width), and 8.0 ft (2.4 m) depth of hold. According to the laws of the U.S. Customs Department, official length was measured on deck from the inside of the stem to the after side of the sternpost; beam was taken to the outside of the planking at the widest part of the ship, and depth was measured from the upper side of the deckbeams amidships to the upper surface of the ceiling (inner) planking in the

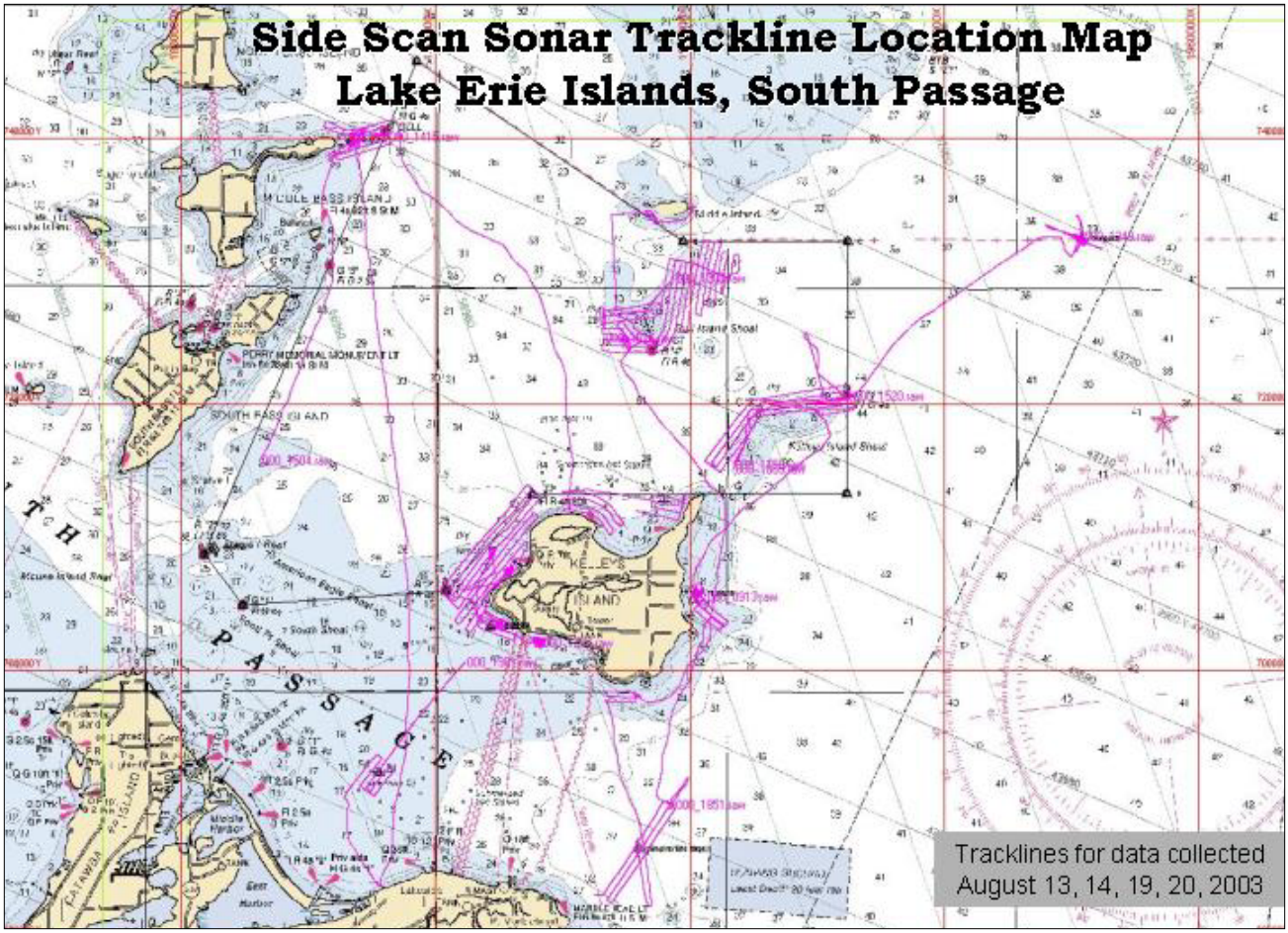

Figure 5-10. Map of the Lake Erie Islands Region, showing side-scan sonar tracklines for area surveyed in the vicinity of Long Point, Kelleys Island (courtesy ODNR, Division of Geological Survey).

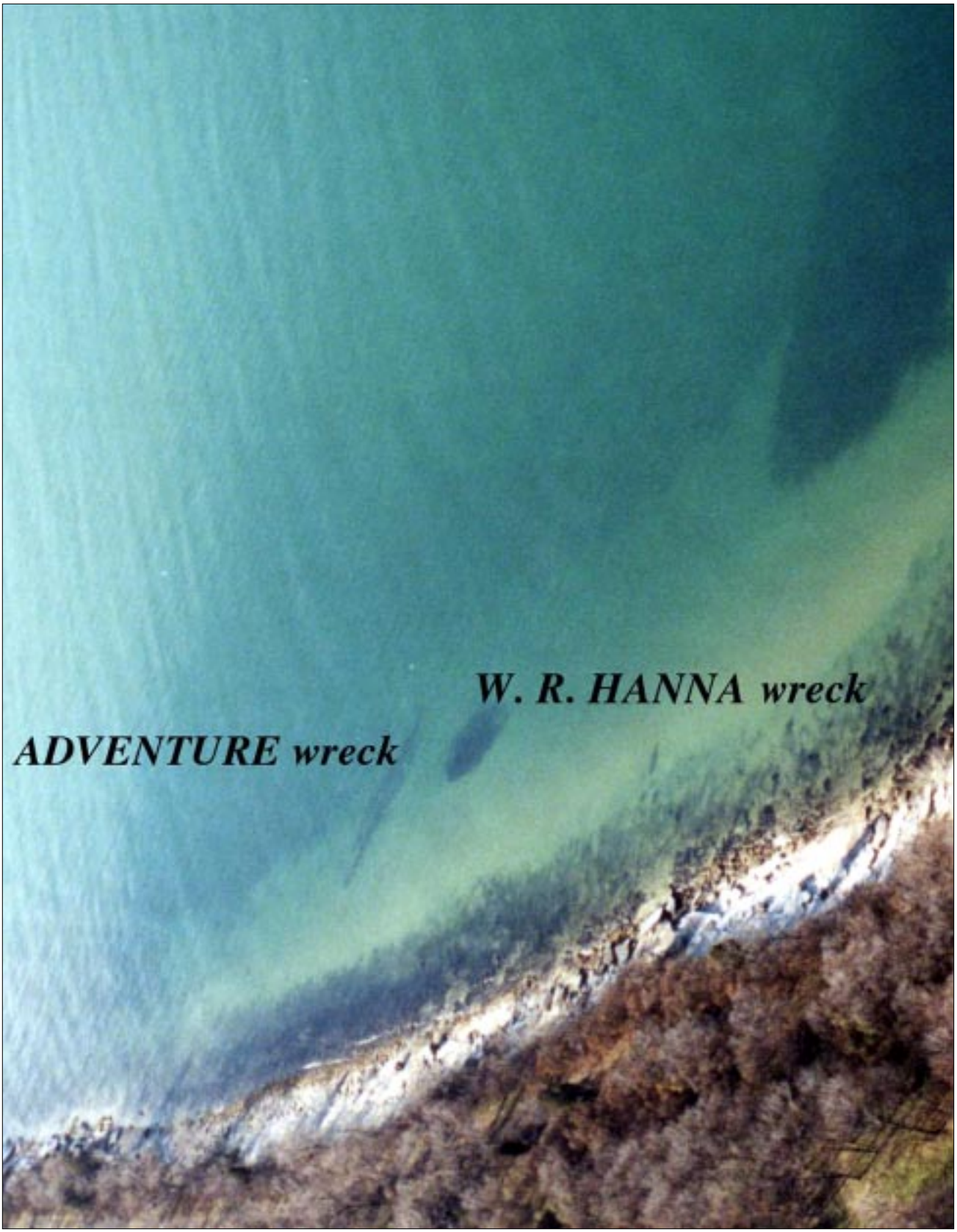

Figure 5-11. Aerial photograph of the North Bay shoreline of Kelleys Island, showing the position of the ADVENTURE *and* W. R. HANNA *wrecks (photograph by Thomas Kowalczk, Marblehead, Ohio, ca. 1999).*

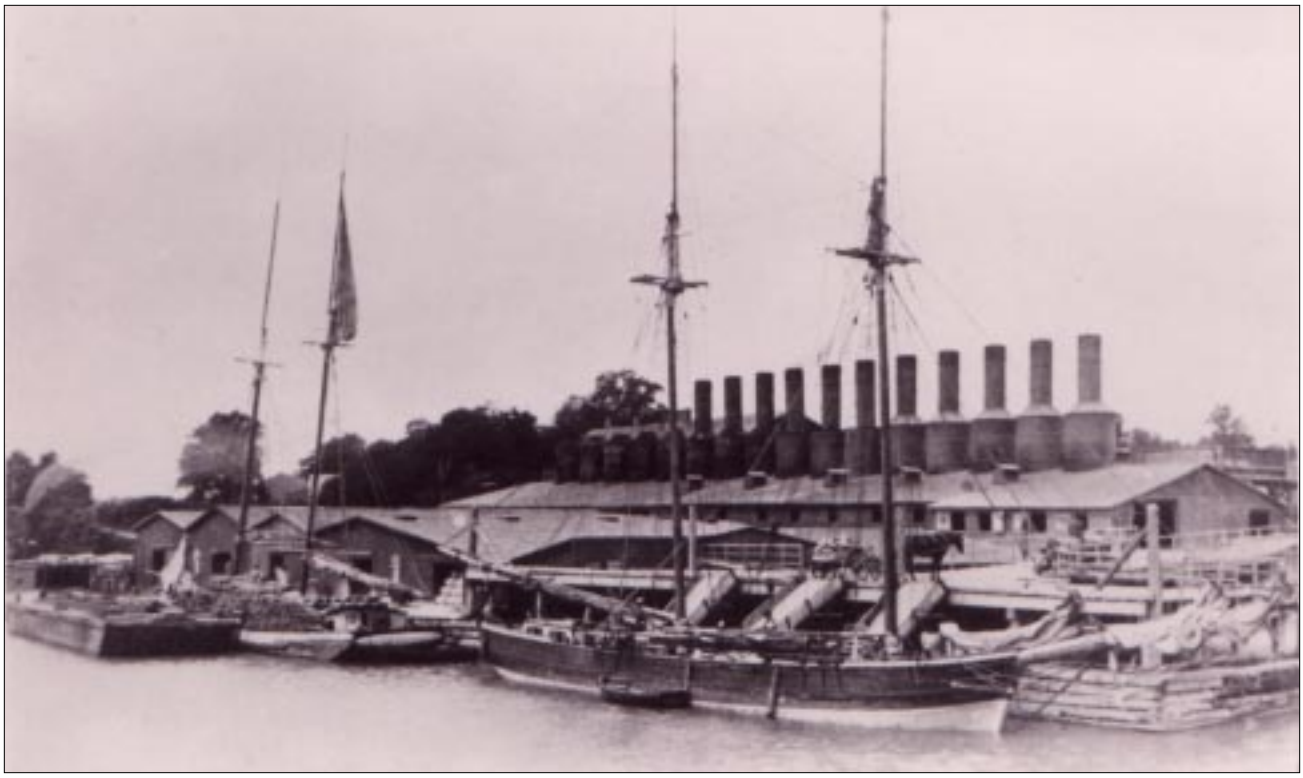

Figure 5-12. Kelley Island Lime & Transport Company's lime dock and kilns at North Bay quarry complex, ca. 1890 (Capt. Frank E. Hamilton Albums, Rutherford B. Hayes Presidential Center, Fremont, Ohio). Wooden schooner at dock is of a design similar to the ADVENTURE *when she was a schooner; wooden barrels stacked in warehouse at stern of schooner were used to ship lime.*

hold. Her register tonnage was 148.97 gross tons and 141.53 net (a "register" ton is equal to 100 ft^3 or 2.8 m^3) of enclosed space, and does not represent a measure of weight). The enclosed space below decks measured 139.86 register tons and she had a "trunk cabin" on her deck aft which measured 9.11 register tons (911 ft^3 or 27.8 m^3). The ship's capacity would have been approximately 250 tons of cargo (175,000 board feet of lumber).

The *ADVENTURE* was among the smaller Great Lakes schooners. Larger and more numerous ones were "canallers" or still larger craft. Canallers measured approximately 145 ft (44.2 m) in length, 25 ft (7.6 m) in breadth, and 10 ft (3 m) depth of hold, and they were several hundred in number. These vessels were tailored to the dimensions of the old (second) Welland Canal (1845 to 1883), connecting Lakes Erie and Ontario. The Great Lakes merchant fleet of the mid-1870s included some 2,000 schooners in all, nearly half of which were canallers (Barry 1996:123,124; Labadie 1989:19-22; Labadie and Murphy 1987:46-50; Mills 1910:183-186).

Schooners larger than canal-size were used principally in the lucrative grain and iron ore businesses or in the Chicago lumber trade, while canallers were employed largely in the Lake Ontario and upper lakes traffic, and the smaller sailing craft were more often engaged in the "itinerant" trades, taking advantage of whatever small cargoes became available at smaller (and often shallower) ports. The largest sailing vessels in 1875 were 200 ft (60 m) long, although a few schooner-barges exceeded that length; these latter craft were principally used as towbarges (Barkhausen 1947:10).

The *ADVENTURE*'s construction appears to have been typical of wooden ships of her day in most respects. She was entirely built of white oak. She had closely-spaced transverse frames, all connected by a longitudinal backbone of heavy oak keelsons. Inner and outer planking was 2-in (5-cm) thick white oak. The whole structure was strengthened by bands of heavier planking, called the "thick strakes," running the entire length of the hull under the deckbeams and

along the bilges on both sides. The hull of such vessels was commonly stiffened further by the use of large tamarack brackets or "knees" under each deck beam where it meets the vessel's sides (although it has not been possible to confirm the use of knees in *ADVENTURE* because so much of the upper hull structure was destroyed in her fire). The ship was iron-fastened, with $^3/_4$- and 1-in iron "treenails" in her frames and smaller $^5/_8$-in round and $^3/_8$-in square nails in the planking.

The initial enrollment was issued to the schooner *ADVENTURE* October 1, 1875 at Detroit, Michigan by special surveyor J. E. Parry. It describes the vessel as having one deck and two masts, plain head and a square stern. The official number assigned her was 105567. The ship's official documents indicate that she was built for Oades' own interests; for the first two and a half years of her existence, she was owned by John Oades ($^3/_4$ interest) and son Walter H. Oades ($^1/_4$ interest). Her first master was George H. Collins. In 1876, the Board of Lake Underwriters assessed the value of the *ADVENTURE* at $8,000. Oades most likely used the craft to transport oak from Ohio ports to his Detroit shipyard property, although no evidence has yet been found to substantiate that premise. John Oades constructed 14 ships on the Detroit waterfront between 1868 and 1890, but he is best known for the 36 vessels he built at Clayton, New York between 1846 and 1865. The earlier vessels included some of the largest and finest passenger steamers on Lake Ontario, along with many barks and schooners. Oades was born at Sacketts Harbor, New York in 1815 and came to Clayton in the early 1840s. He relocated to Detroit in 1865, where he superintended the highly successful Campbell & Owen shipyard before resuming business on his own two years later (Wright 1969:94-95).

Enrollment documents dated April 2, 1878 (Detroit, Michigan) show a change of ownership to Edward Cunningham ($^1/_2$) and F. B. Wallace ($^1/_2$). Both men were from Detroit, and Edward Cunningham was listed as master. Little is known of the schooner's activities during this time. *Inland Lloyds Vessel Register* for 1884 lists *ADVENTURE* with a valuation of $5,000. Another enrollment was issued at Detroit on April 13, 1886, showing a change of ownership to Edward Cunningham ($^1/_4$), F. B. Wallace ($^1/_2$) and J. E. Wallace of Chicago, Illinois ($^1/_4$); Edward Cunningham continues to be given as master. The 1886, 1888, and 1890 editions of the annual *List of Merchant Sailing Vessels of the United States* list Detroit, Michigan as her home port.

In 1891, enrollment documents issued on February 13 show a change of district to Cleveland, Ohio, and a change in ownership to H. C. Case of Sheffield, Ohio ($^1/_2$) and J. F. Padley of the same place ($^1/_2$); Case is given as her master. On May 25, 1894, the ownership was shifted to H. C. Case ($^1/_4$) and J. H. Padley ($^3/_4$), with Case remaining in command. April 11, 1895, documents of show J. H. Padley ($^3/_4$) and J. M. Robinson of Lorain, Ohio ($^1/_4$) as owners and Robinson as her master. J. M. Robinson became sole owner of the schooner early in 1896 as reflected in an enrollment at Cleveland, Ohio dated February 4. Erroneously, the 1897 edition of *Inland Lloyds Vessel Register* continues to list Detroit as port of hail and the owners as Cunningham et al. The insurance value listed in this edition of *Lloyd* is only $1,500. At some time during the winter of 1896-1897, Robinson took in a partner. A new enrollment issued at Sandusky, Ohio on April 20, 1897 shows the vessel owned by Robinson ($^1/_2$) and Frederick Groch of Sandusky ($^1/_2$).

After serving as a sailing vessel for two decades, the *ADVENTURE* was rebuilt as a screw steambarge at Sandusky, Ohio in 1897 by Henry D. Root of nearby Lorain. The conversion seems to have been done on property owned by David Dussault. Dussault operated a sand and gravel business on the Baltimore & Ohio dock at the foot of Warren Street, and on another dock at the foot of Meigs Street in Sandusky. Second-hand machinery was used for the ship's conversion.

Root was very highly regarded in marine circles, having operated a shipyard at Lorain from the early 1850s until 1907 or 1908; he is credited with building some 49 vessels and rebuilding several others. He built all manner of Great Lakes craft, but principally schooners in the early years and fish tugs after 1890.

The rebuilding of the *ADVENTURE* from a schooner to a steambarge was effected by reconstructing the ship's square stern and installing a boiler, engine, tailshaft, propeller, and rudder. Simpler tasks included removal of the ship's bowsprit and her after (main) mast, relocating the foremast, and erecting a small forecastle at the bow. A cabin was also constructed on a raised poop deck at her stern (Figure 5-13).

Essential machinery consisted of a small, single-cylinder high-pressure vertical steam engine salvaged from the steambarge *HANDY BOY* and a boiler from the tug *MYRTLE*. The engine, with a 16-in cylinder and an 18-in stroke, had been fabricated in 1881 by Phoenix Iron Works at Port Huron, Michigan, and used in the *HANDY BOY* until that craft was destroyed by fire at Huron, Ohio September 4, 1888. The *HANDY BOY* was very nearly the same size as the *ADVENTURE*, measuring 104.6x25.9x7.5 ft, and 136 gross tons. The Kelley Island Lime & Transportation Company last owned her. The boiler used in the *ADVENTURE* came out of the 50-ft (15 m) tug *MYRTLE*, which was built in 1875 at Black River (Lorain, Ohio) and owned by Fred Groch, the same man who purchased the *ADVENTURE* shortly before her 1897 rebuilding (Wendt 1984:129). Although the tug was abandoned at Sandusky around 1892, she may have been out of service for some time previous to that date: the Marquette (Michigan) *Daily Mining Journal* advertised on December 17, 1887: "The tug *MYRTIE* [sic] of Sandusky - for sale cheap; in first-class condition. Write to Fred Groch, Sandusky, for particulars." According to the 1902 edition of *Beeson's Marine Directory*, the boiler was the firebox type of an unknown manufacturer and measured 5 ft 6 in diameter and 12 ft length.

Following her 1897 reconstruction for Robinson and Groch, the *ADVENTURE* measured 108.0 ft (32.9 m) length, 24.0 ft (7.3 m) beam, and 8.3 ft (2.5 m) depth of hold. Her draft would have been about 8 ft (2.4 m) aft and 6 or 7 ft (1.8 or 2.1 m) forward. Her register tonnage was changed to 141.72 gross tons and 95.37 net tons. Because of the space taken up by her machinery and coal bunkers, the ship's cargo capacity was somewhat reduced. No revised capacity figure has yet been found, but it may be estimated at 200 tons or approximately 150,000 board feet, based on a comparison with similar vessels. The 1902 edition of *Inland Lloyds Vessel Register* indicates that she was approved for deckloads of lumber up to 7.5 ft (2.3 m) high. Following her rebuilding, *Inland Lloyds Vessel Register* (1897) listed the vessel's insurance evaluation as $6,000.

Temporary enrollment documents for April 20, 1897 (Sandusky, Ohio) show master carpenter H. D. Root of Lorain, Ohio as the rebuilder of the vessel. She was rebuilt as a screw steamer with one deck and two masts, plain head, and a round stern. Ownership is given as J. M. Robinson of Lorain, Ohio ($^1/_2$) and Frederick Groch of Sandusky, Ohio ($^1/_2$) with J. M. Robinson remaining as master. Later that spring, permanent enrollment documents issued in Cleveland (May 26, 1897) list the owners as Frederick Groch of Sandusky ($^{51}/_{104}$), J. M. Robinson of Lorain, ($^{51}/_{104}$), and A. C. Moss of Sandusky ($^2/_{104}$). The home port is given as Lorain, and the master is listed as S. J. Putnam (or S. J. Batman). During 1897, William H. McNalley, George Besh, and John M. Robinson also served as masters of the *ADVENTURE*.

The Groch Coal Company likely ran the *ADVENTURE* from Sandusky to Lorain and Cleveland, Ohio in the stone, lime, and cement trade from 1897 until 1901 when she was sold to parties from Port Huron, Michigan. The 1897 edition of *Inland Lloyds Vessel Register* for sidewheel steamers and propellers lists the value of *ADVENTURE* at $6,000 with the port of hail as Sandusky, Ohio and the owner as Robinson et al. The 1898 edition of *Lloyds* shows a decrease in value to $5,000 and the 1900 edition shows a marked, further decline to $1,500. Enrollment documents for June 8, 1898 show Frederick Groch as the sole owner and master.

Frederick Groch surrendered enrollment for the *ADVENTURE* in the Sandusky District on May 31, 1901. The surrender document lists him as both owner and master. Also on May 31, 1901, the new owners Charles Beyschlag ($^1/_3$), Joseph Lowes ($^1/_3$), and Jno. Beyschlag, Jr., ($^1/_3$) all of St. Clair, Michigan, enrolled the *ADVENTURE* at Port Huron, Michigan. Charles Beyschlag is given as master. The 1903 edition of *Beeson's List of American Steam Vessels on the Lakes* gives owner or manager as Charles Beyschlag of St. Clair, Michigan. In 1901 a new deck was installed and she was refitted. Correspondingly, *Lloyds* upgraded the value of the vessel to $5,000. From 1901 until 1903 the *ADVENTURE* was engaged in the transport of lime and limestone from Kelleys Island and the delivery of salt to Sandusky, as well as handling cargoes of gypsum in the vicinity of Tawas Bay, Lake Huron (Dorr and Eschman 1970:125,126). The 1902 edition of *Merchant Sailing Vessels of the United States* listed the crew size of four and the home port as Port Huron. The October 8, 1903 edition of the *Sandusky Daily Register* reported that the *ADVENTURE* had been in port at Sandusky "a day or two ago and discharged a cargo of salt at the Big Four docks." On the same date

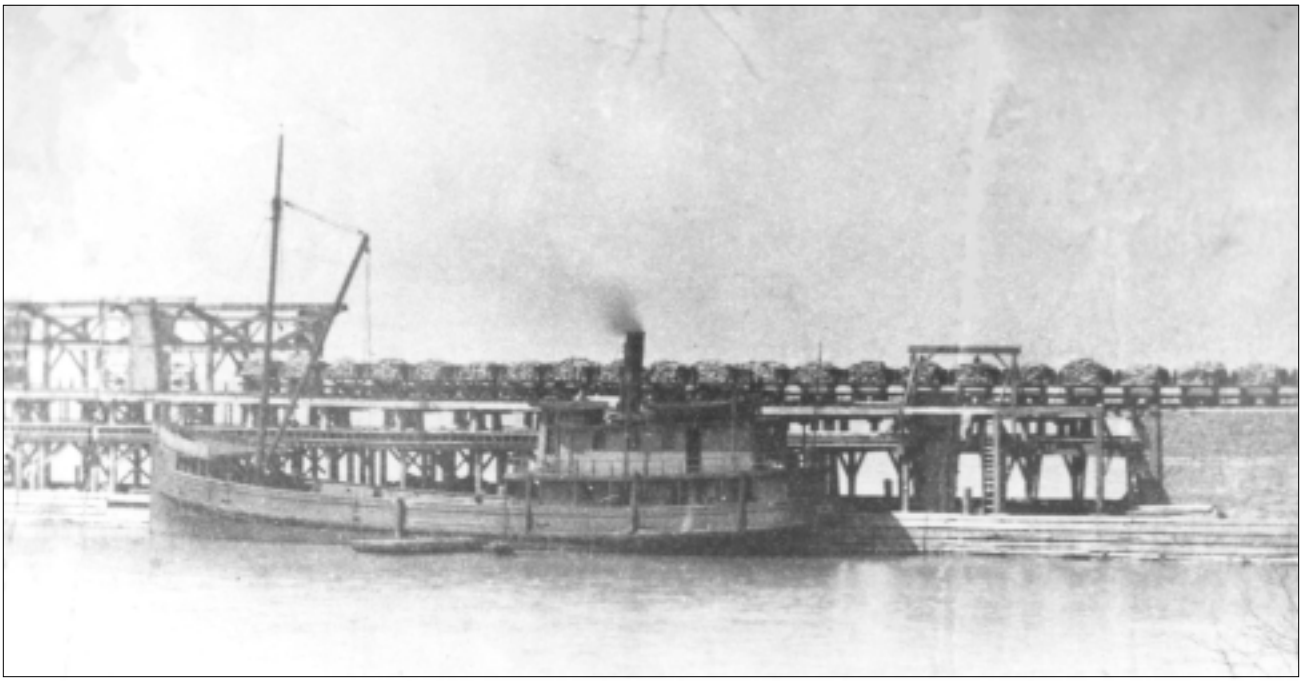

Figure 5-13. Steambarge ADVENTURE *at North Bay dock, Kelleys Island, Ohio, ca. 1903 (courtesy Great Lakes Historical Society).*

the *Sandusky Evening Star* stated that the *ADVENTURE* was owned by "Charles Beyschlag of St. Clair, Michigan" while the *Port Huron Daily Times* and *Cleveland Plain Dealer* gave the owners as "Beyschlag, Schlinkert and Lowes of St. Clair."

On October 6, 1903, the *ADVENTURE* sailed from Sandusky to Kelleys Island, Ohio. During this voyage the *ADVENTURE* was commanded by Captain John Lowes who had his wife and young daughter on board. By 4:00 in the afternoon of October 7, she had taken on a cargo of burned lime at the Kelley Island Lime and Transport Company's North Bay dock when disaster struck. While lying at the dock she caught on fire. Flames were first discovered just forward of the boiler in the hold and soon the ship was ablaze. The *Sandusky Daily Register* reported that the fire "spread so rapidly that the sailors were glad to escape with their lives." The *Sandusky Evening Star* stated "It is reported that the lime became wet and was set afire, but this report is not confirmed." When it was seen that the ship could not be saved, prompt action by Captain Regan of the steam tug *L. P. SMITH* in getting a line onto the burning steamer and towing her out into North Bay saved the schooner *ALEX ANDERSON,* which was lying dangerously near the burning craft. The *ADVENTURE* was towed to shoal water near the base of the island's northeast point (Long Point) and allowed to burn itself out.

The *Sandusky Evening Star* reported that the captain and his family, as well as the crew were rescued but narrowly escaped death, and most of their belongings were destroyed (October 8, 1903). The steamer and its cargo were a total loss as the vessel burned to the water line and sank in about 15 ft (4.6 m) of water some 200 ft (60 m) off Long Point in North Bay. The estimated value of the loss in 1903 was $2,500 for the vessel and $1,500 for the lime cargo. The *Sandusky Daily Register* reported that the vessel and its cargo were uninsured (October 8, 1903).

ARCHAEOLOGICAL DOCUMENTATION

The wreck of the steamer *ADVENTURE* was relatively well known to sport divers of the western Lake Erie area, but no serious efforts had been undertaken to document the features of this archaeological site. Certain artifacts have been removed through the years, most probably including the boiler by commercial salvagers soon after the sinking, and the propeller in the 1960s by a Newark, Ohio diving club. The objectives of the 1997 project were to train a cadre of avocational divers in the techniques of shipwreck documentation and then put

these newly acquired skills to the test by conducting an archaeological study of the *ADVENTURE*. The course was designed to offer SCUBA divers an appreciation of the underwater cultural resources of Lake Erie, information on the construction of historic vessels and their historical and archaeological significance, and underwater techniques for documenting shipwrecks. The experience was a blend of lecture, dry- and swimming pool-simulation laboratories, plotting exercises, and actual shipwreck site mapping. The workshop was sponsored by a grant from the Lake Erie Protection Fund and by in-kind services from the Great Lakes Historical Society and the Ohio Sea Grant College Program at The Ohio State University. The workshop provided a group of 38 underwater archaeology students with an opportunity to document the wreck of the *ADVENTURE*, which facilitated the preparation of detailed maps and drawings of the site, as well as to participate in the restoration of the vessel's propeller.

After locating the site based on sports diver tradition, a general reconnaissance dive was performed to determine the basic orientation of the shipwreck and identify the major features to be mapped. The primary documentation technique selected for the site was the trilateration method. This method required first establishing a baseline coincident with the keel of the vessel, and fastening a durable tape measure longitudinally along the entire length of the shipwreck and extending it 20 ft (6 m) beyond the bow and stern. Major features of the wreck selected for mapping were marked by attaching plastic squares on which identifying numbers were placed with a water resistant marker. Teams of divers were then sent to specific segments of the wreck to locate these features. The precise location for significant points on the feature was achieved by recording the distance to that point from two positions on the baseline, thus forming a triangle with the feature at the apex.

Once the positions of the major features were determined, teams of divers were assigned specific details to measure and sketch. A preliminary site map was constructed in the field as the dive teams returned to the shore and reported their findings. Later, individual sketches were then integrated into an overall site map (Figure 5-14). A video camera in waterproof housing was used to record the wreck, using a right-angle vertical orientation, a uniform distance of 10 ft (3 m), and a predetermined grid to ensure thorough pictorial coverage of the entire site. The resultant footage was used to verify the manually-recorded site information and to fill in details which may have otherwise escaped the documentation procedure.

The reconnaissance dive on the site revealed that the shipwreck lies between 125 ft (38 m) and 275 ft (84 m) offshore of Long Point, in North Bay. The shoreline consists of shelving bedrock and low limestone cliffs. Offshore the bottom consists of silty sand mixed with gravel, limestone cobbles, and large glacial boulders. On this material, the remains of the *ADVENTURE* lie nearly flat to slightly canted toward the port (left) side. A thin layer of zebra mussels (*Dresissena polymorpha*) colonized most of the exposed surfaces of the wreck. The extant ship's hull is 102 ft (31 m) long, extending from the sternpost to a point near the bow, with a maximum width of 24 ft (7.3 m). It lies on a heading of N23°E, with the stern at the northern extremity, in depths ranging from 10 to 15 ft (3 to 4.5 m). The 19-ft (5.8-m) stem and forefoot structure is detached and separate, lying 155 ft (47.2 m) northwest of the forward end of the hull and 160 ft (48.8 m) west of the sternpost, in approximately 18 ft (5.5 m) of water. The position of the shipwreck components was determined using standard land surveying techniques once divers had placed buoys to mark the extremities of the sections.

Interestingly, a second shipwreck was observed very near the *ADVENTURE* Site. About 50 ft (15 m) southeast of the stern of the *ADVENTURE* lies the remains of an 80-ft-long (24 m) wooden scow schooner, lying along an east northeast axis, and laden with rough cut limestone blocks of irregular sizes. While this was at first believed to be part of the *ADVENTURE* wreck, its size and characteristics soon established that it was a separate but unidentified vessel (Figure 5-11). Further investigation revealed that the scow schooner was the *W. R. HANNA* (Figure 5-11) which sank in a storm on October 15, 1886. This vessel was documented in 1998 and 1999 (Labadie and Herdendorf 1999,2004b).

The remains of the steamer *ADVENTURE* are largely intact, although the fire that ended the ship's career reduced her hull to the waterline, and only her framing and bottom features survive to the present time. The hull is entirely white oak, and most of its structural features are well preserved and solid, although there are clear indications of the fire that consumed the

remainder of the ship. The iron fastenings are also well preserved, as are numerous machinery parts. The ship's hull is characterized by a heavy oak backbone composed of several longitudinal keelsons, together with transverse ribs (frames), and longitudinal oak planking both inside and outside the frames. Underwater measurements were made in U.S. Customary Units and are thus reported here rather than conversion to Metric (SI) Units. The "position" numbers refer to location on the baseline (Figure 5-14).

Framing. The backbone of the vessel is made up of seven individual keelsons, each 9x9 inches in cross-section, with three fixed to the frames, three "riders" above them, and the seventh along the centerline on top. The outermost of the keelsons are reinforced by bands of $^{3}/_{4}$-in iron 18 in wide, running much the length of the hull, i.e. from position 53 on the baseline all the way forward to position 101. These reinforcing elements would have the effect of adding another oak keelson on each side (Inches 1962:32; Slyker 1958:11,12). The keel itself is far less significant than the keelsons. It is fixed to the underside of the frames, and it measures 9 in width and 5 in depth. The keelsons run from the sternpost all the way forward to the point where the forefoot and stem once connected, a length of 102 ft, although not all of the 6 individual members have survived intact. The structure is intact from the engine bed near the stern (14 ft forward of the sternpost) to a point some 83 ft forward; only the lower three keelsons extend the remainder of the hull's length.

The keel structure is pierced at mid-length by the trunk for a centerboard, which undoubtedly survived from the ship's schooner days, although centerboards were also used in many steambarges. Centerboards were basically a feature required in sailing vessels. They were a form of adjustable keel, used to keep a ship on course when a beam wind tended to drive the bow sideways, especially when the ship was "light" or without cargo (Barkhausen 1990; Cuthbertson 1931:235-237; Inches 1962:31). The centerboard was lowered through a slot in the ship's keel, thus the opening or "trunk." *ADVENTURE*'s centerboard trunk was 33 ft long, extending from the 52-ft mark on the baseline forward to the 85-ft point. The trunk originally would have stood at least eight ft high, reaching right up to deck level. Its opening was 4 $^{1}/_{2}$ in wide and 31 ft long. The centerboard itself was pivoted on a pin at the forward end of the trunk and raised by means of a small winch on deck with a chain leading to the after end of the board. No evidence of the pivot-pin was found in the wreck, but a portion of the winch was located in the starboard side of the wreck abreast of baseline point 65. In the way of the centerboard trunk, the ship's frames were strengthened by a third "futtock" extending outboard some 4 ft from the centerline, while the remainder of the ship's frames were made up of only two futtocks. The highest points of the centerboard trunk are presently no more than 3 or 4 ft from the ship's bottom due to fire damage and decades of erosion by water and ice.

The common method of fabricating ship's frames in 19th century America was to build them up or laminate them, using overlapping sections or futtocks (Estep 1918:35-44; Greenhill 1988:103-109). Each of the *ADVENTURE*'s frames is 8 in wide, made up of two 4-inch-wide futtocks. The frames extend from rail to rail, right across the ship's bottom, with the keelsons fixed to their upper surface and the keel underneath. They taper in their depth from 8 in at the centerline to 6 in at the bilge; although no frames have survived above the bilge-line, it is estimated that they would have been no more than 4 or 5 in deep at deck level. The frames are spaced at 22-in intervals, leaving 14 in space between adjacent frames. A frame spacing of 22 in was typical in ships of the *ADVENTURE*'s era, although with their 8-in width, her frames are somewhat lighter than average.

One element of the ship's construction that is not entirely typical is the arrangement of the stern framing. Most wooden ships have "cant frames" at the ends, both forward and aft. These are half-frames which do not run continuously all the way across the hull of the ship, as do the frames in the midships portion of the hull, but instead they are fixed to either side of the stempost and the sternpost (Paasch 1890). In the case of the *ADVENTURE*, the stern frames do run all the way across the hull, right through the "deadwood" at the sternpost. Instead of the more common tapering of the "run" into the sternpost, *ADVENTURE*'s hull is very full and round aft, with a flat underside and a projecting "skeg" sternpost. Although this configuration has been observed in other wooden ships, it is not common. Interestingly, in at least one other case where this pattern was observed, it was in the steambarge *SIDNEY O. NEFF*, which had, like the *ADVENTURE*, originally been built as a schooner (Jackson 1983:107-114). It is assumed that this unusual

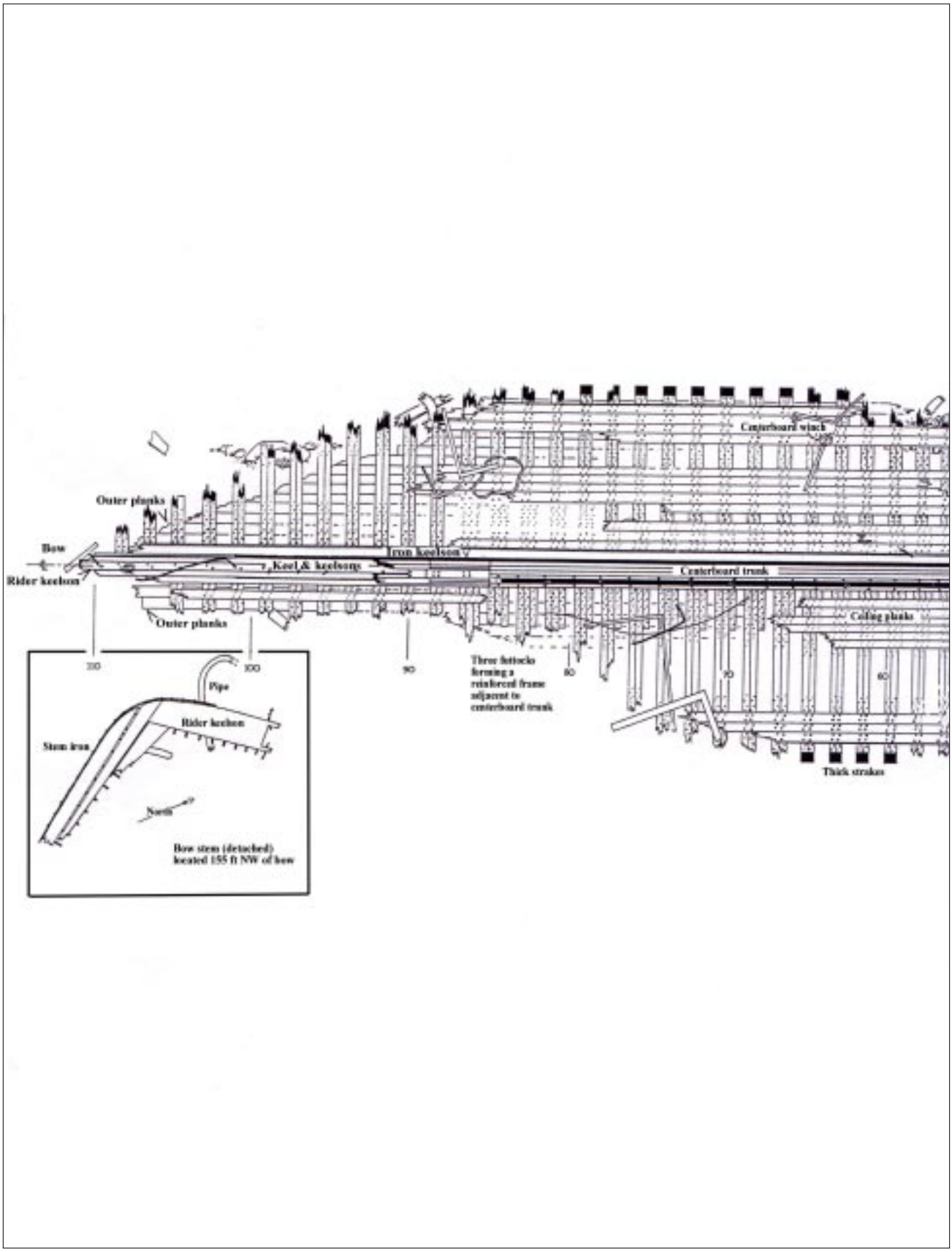

Figure 5-14. Site plan of the steambarge ADVENTURE *(after Labadie and Herdendorf 1998).*

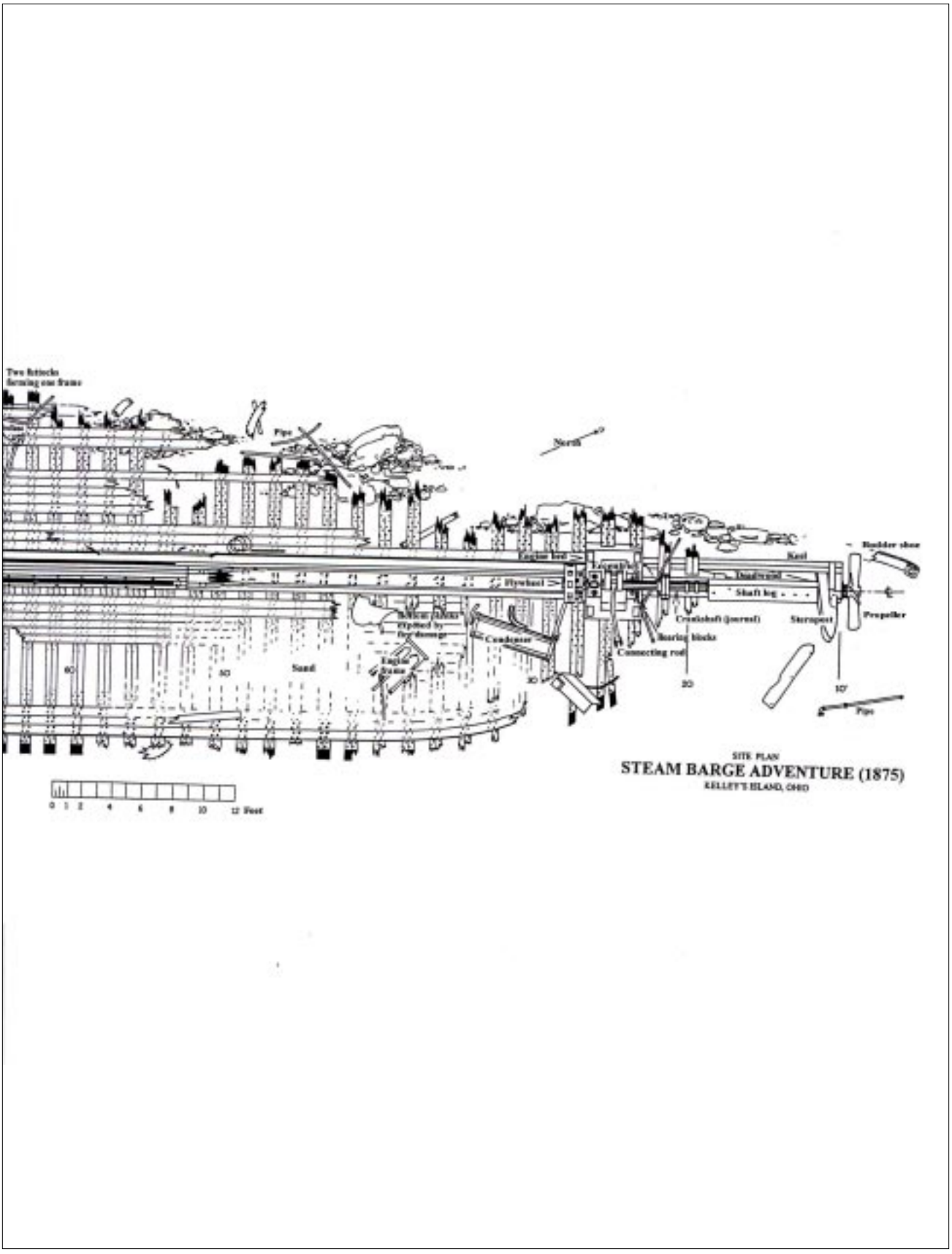

Figure 5-14. CONTINUED.

method of framing the stern had to do with its transformation from the original square transom design to the round overhanging stern typical of steam vessels.

The ship's fastenings are unremarkable. Keelsons and frames are fastened together with 1-in round iron "treenails." Frames have their individual futtocks fixed together with $^{3}/_{4}$-in treenails. Planking is fastened with a combination of $^{3}/_{8}$-in square nails and $^{5}/_{8}$-in round treenails; in the thick strakes, "clench rings" or "rove washers" are used on the treenails to make the fastenings doubly secure (Desmond 1919:58-61). Most of the fastenings in the *ADVENTURE* wreck are solid and little deteriorated. Few loose fastenings were observed, while most wooden vessels that suffered similar fire damage are littered with them; it may be assumed that through the years divers have removed many loose treenails, bolts, and nails.

At the forward end of the wreck, the stem has been separated from the keelsons where it was once attached, and it lies flat on the lake bottom some 155 ft away, with its bottom oriented roughly to the north and its upper end to the west. The stem is built up of several oak timbers. It is 19 ft long and tapers from 24 in depth at the bottom to 15 in depth at its top. The stem is "arcuate" or bow-shaped, forming an arc of approximately 75°. The upper portions of the stem are much deteriorated, and it is supposed that it suffered fire damage. The ends of several planks are still attached to the rabbet (groove) on the underside of the stem.

Planking. Like all of her contemporaries, the *ADVENTURE* was double-planked. She had 3-in oak planking both inside and out, securely fixed to each frame with iron "treenails" and spikes (Desmond 1919:56-61; Estep 1918:64-71). The planking was from 8 to 14 in wide and up to 40 ft length. On the inside of her hull, the ship also had 4-in "thick strakes" to reinforce critical areas (Desmond 1919:63). Thick strakes were bands of three or four planks at the turn of the bilge and just under the deck beams at the ship's sides; these bands of heavier planking acted as trusses to contribute longitudinal stiffness to the hull. Much of the exterior planking has survived as well as some of the interior "ceiling." One 60-ft^2 area on the port side about 20 ft forward of the engine mount shows extensive fire damage. This is thought to have been the location of the coal-bunker, and it may have been the source of the fire that destroyed the ship.

Machinery. A very visible assembly at the stern of the ship is the engine bed with its adjoining shaft-log and sternpost. These structures are the most tangible remains of the ship's power plant, which at one time consisted of a boiler, a single-cylinder reciprocating steam engine, crankshaft, tailshaft, propeller, and rudder, plus smaller engine-room auxiliaries. While the boiler is gone and the cylinder-head has been removed from the engine, numerous artifacts still remain in the wreckage, including broken castings, bent rods and eccentrics, piping, and the ship's 5-ft-long condenser. The rectangular engine bed is built up of thick 12-in oak timbers tied securely into the ship's keelsons and frames at a point some 15 ft forward of the sternpost, measuring 41 in length and 51 in width. The cast iron engine frame is detached, but lying on the port side of the vessel about 15 ft forward of the engine bed. Eight 1 $^{1}/_{2}$-in studs used to bolt down the engine are still standing in the engine bed, but the nuts are all gone, perhaps indicating an effort to salvage the engine.

The distinctive cast-iron flywheel measures 3 $^{1}/_{2}$ in thickness and 26 in diameter; it stands at the forward end of the engine bed, still fixed to the crankshaft. The crankshaft itself, with its associated journals, piston rods, and eccentrics lies intact in its bearings, although all of the connecting rods are twisted and broken off. The crankshaft measures 6 in diameter. The tailshaft is still coupled to the crankshaft; it too, measures 6 in diameter and 12 ft 6 in length from the coupling to the point where it has been cut off flush with the stern bearing at the after end of the sternpost. The tailshaft runs through a 9-ft 6-in oak shaftlog of 15x15-in cross-section. The ship's 5-ft diameter, four-bladed, cast-iron propeller wheel was removed by divers in the 1960s, and while it was not at the site during the 1997 investigations, it has since been restored to its original position. The propeller has fixed "buckets" or blades. It is not clear whether or not it was also salvaged from the steambarge *HANDY BOY* when the engine was removed. The *ADVENTURE*'s rudder was not found, but the 1-$^{1}/_{2}$ in thick iron rudder shoe is still fixed to the sternpost, with its trailing edge projecting 4 ft 6 in into the sand.

An interesting feature found in the ship's wreckage is a large iron casting believed to have been one of the support frames for a deck winch. This artifact was found on the starboard side of the wreck near the turn of the bilge, at baseline position 66. It is of heavy construction, roughly triangular in shape, and

measuring 31x34x42 in. The casting has numerous holes for bolts and shafts. The winch may have been used for mooring lines and for the ship's centerboard. A second large artifact associated with the wreck is the cylindrical condenser, which was observed lying near various engine parts on the port side at point 30 on the baseline. This apparatus captured the steam exhaust from the engine and turned it back into water by cooling it. The water was then recycled back into the ship's boiler. The condenser consists of a riveted-steel drum with steam piping coiled inside it. It measures 18 in diameter and 60 in length. The third large artifact is the lower portion of the ship's main engine, which consists of a four-legged cast-iron pedestal. This feature lies on the port side opposite position 40 on the baseline, just forward of the condenser. It measures 42 in height and has an upper surface 2 in thick and 32 in square. The cylinder would have been fixed to this surface.

Replacement of Propeller. The 1,600 lb propeller of the *ADVENTURE* was salvaged by the Poseidon Diving Club of Newark, Ohio in 1964. Divers from the club spent several weekends cutting the shaft by hand with hacksaws. The massive cast-iron propeller had four blades and measured 5 ft diameter. For many years the propeller was displayed at the Newark YMCA as a trophy welded to a flagpole. In 1992, the flagpole was dismantled and the propeller was relegated to a scrap pile behind the city maintenance garage in nearby Heath, Ohio. With the cooperation of Poseidon Diving Club and the City of Heath Street Department, the propeller was released to the workshop project, loaded on a trailer, and transported to Lakeside, Ohio on October 17, 1997. The following day the propeller was suspended from an A-frame mounted on the 45-ft long salvage vessel *CHARLOTTE MARIE* (operated by Neil Shrock Towing and Salvage, Inc.) and escorted to North Bay of Kelleys Island by rescue boat *DIVE 1* of the Lakeside Fire Department. At the shipwreck site, divers from the fire department and the workshop, positioned the stern of the *CHARLOTTE MARIE* over the stern of the *ADVENTURE* and the propeller was slowly lowered to its approximate original position. This marked the first time a major artifact has been replaced on a shipwreck in the Ohio waters of Lake Erie, an action taken to encourage divers to preserve Ohio's underwater heritage and perhaps return other artifacts to their original location on wreck sites.

Cargo. The cargo capacity of the *ADVENTURE* following her 1897 reconfiguration has not been determined, but it is estimated that it might not have exceeded 170 tons. The ship's final cargo was reported as lime, most probably stored in wooden barrels. Small accumulations of a grayish-white slurry were found in the ship's hull adjacent to the keelsons and approximately 20 ft forward of the engine bed. Samples were obtained from the site, and after drying, this material effervesced freely when drops of dilute hydrochloric acid were applied, suggesting that the samples represented the remnants of a lime cargo, perhaps the residue of numerous cargoes carried by the steamer. The hydrated lime deposits were found adjacent to the keelsons on the starboard side of the ship, but no evidence of barrels was noted, such as staves, iron hoops, or flat ends.

Economical water transportation has been noted as the prime factor in the growth of Kelleys Island into the largest limestone producing center in Ohio and the lower Great Lakes region at the turn-of-the-century (Orton and Peppel 1906:212). At that time limestone was sold by weight and a ton of dimension stone was marketed between $1.00 and $2.00, whereas lump lime in barrels ranged form $5.50 to $6.00 per ton. In 1905 the cost of barrels ready to fill was about $0.21 each. Barrels of "ordinary size" were used, with $15^1/_2$- to $16^1/_2$-in heads and $28^1/_2$-in staves. An empty barrel weighed 15 to 16 lbs and could hold 185 lbs net of lump lime or nearly 400 lbs of ground lime (very little ground lime was shipped in barrels). The cost of producing a barrel of lump lime from quarry to loaded aboard a vessel included: quarrying and transport to kiln $0.05, fuel $0.07, labor $0.09 fixed costs $0.04, barrel $0.21, for a total of $0.46. The F.O.B. dockside price was about $0.56 per barrel (Orton and Peppel 1906:232).

The precise size and capacity of the barrels produced at the KIL&T Co. cooperage was not determined because of the lack of physical evidence, however, some approximations can be given based on published material and period illustrations. Heisler (1987:533) gives the weight of a barrel of dry cement (mixture of calcined limestone and clay) as 376 lbs. Using the density of bulk of quicklime (55 lb/ft^3), such a barrel would have a volume of 6.8 ft^3 or approximately 51 gallons (Eshbach 1952:146). Considering the cargo capacity of *ADVENTURE*, which equates to about 340,000 lb, she could carry

about 900 barrels. Volumetrically, allowing for a 20% loss of space for packing a cylindrical barrel (Leeming 1942:431), this cargo would equate to 7,340 ft^3 or about 77% of the available 9,537 ft^3 of cargo space.

Summary. The *ADVENTURE* was one of dozens of steam and sailing vessels that serviced the limestone industry of Kelleys Island in the late 1800s and early 1900s. Although *ADVENTURE* was among one the smaller calling at the island, she was capable of carrying a cargo in excess of 900 barrels of burned lime. However, the only known record of the *ADVENTURE* taking on a cargo at Kelleys Island is the day she caught fire at the lime kiln dock and sank in North Bay. The sinking took place in the midst of peak lime production on the island, a period when KIL&T Co. was one of the leading crushed limestone and lime producers in the world. Perhaps the high demand for lime products in 1903 was the reason the *ADVENTURE* was pressed into service to augment the vessels operated by KIL&T Co.

Archaeological investigations of the shipwreck site have provided a likely answer to the question of the fire's origin. Contemporary newspaper accounts mention both flames from the boiler and wetting of the lime as possible causes of the tragic fire. Because a large area on the port side of the vessel, forward of the engine mount, shows extensive fire damage the first possibility is most likely. The fire-damaged area is thought to have been the location of the coal-bunker, and it may have been the source of the fire that destroyed the *ADVENTURE*.

A number of research questions remain unanswered after the field investigations. One of the most baffling being the fate of the more than 900 barrels of lime that were thought to be on board at the time of the sinking. Contemporary newspaper articles report that the vessel was fully loaded with a lime cargo and that the entire cargo was lost in the fire and subsequent sinking. Yet no evidence of any barrels (particularly their metal hoops) was found on the site, suggesting that a salvage effort may have been initiated soon after the sinking.

SCOW SCHOONER *W. R. HANNA*

Following the 1997 survey of the steamer *ADVENTURE*, plans were made to return to Kelleys Island the next year and to survey the small scow schooner found nearby (Figure 5-11). The scow wreck was not believed to be of singular historical value, and it had clearly suffered from decades of exposure to shallow water and sports diving activities. Virtually no retrievable artifacts were seen at the site. However, very little direct evidence exists on this important category of Great Lakes vessels (Figure 5-15) so it was deemed worthy of documentation. No attempt was made at recording of the site with traditional XY-coordinate grids and the stratigraphic measurements normally employed on terrestrial sites. Rather, a simple reliable method was chosen to map the site as efficiently and accurately as possible with the resources available. Wherever possible, simple right-angle measurements were used to establish the location of wreck features, taking advantage of the structure of the ship itself. Since the bottom planking was known to lie at right (90°) angles to longitudinal structures like the keel or keelsons, the bottom planks could be used like draftmans' T-squares to ascertain right-angle measurements outboard on either side of the baseline. When it was not possible to fix the location of some feature using the right-angle method, the trilateration method was employed. Using this technique, two measurements are required from different positions on the baseline, and the feature can be shown to lie at the intersection of two arcs defined by the separate measurements. Field investigations were conducted in October 1998 and June 1999 and results of these investigations were reported by Labadie and Herdendorf (1999,2004b) and Herdendorf et al. (2002) and are summarized here. The *W. R. HANNA* Site (33ER488) is located at N41°37.091', W82°40.849'.

HISTORICAL DOCUMENTATION

The scow schooner found alongside the steambarge *ADVENTURE* in 1998 was not immediately identified. There were no known local traditions regarding the wreck. Veteran local divers thought that the vessel was part of the larger steamer, although some had been diving on it for years. As a result, no effort had been made to determine the identity of the sunken scow. When it was established that the wreck was indeed distinct from the nearby *ADVENTURE*, standard historical sources were consulted. None described a wreck near the *ADVENTURE* Site, although many small sailing craft were reported lost in the general vicinity of the Lake Erie Islands and the nearby Pelee Passage. Among the vessels lost in the area were several scow schooners.

Figure 5-15. Unidentified scow schooner in the Detroit River, ca. 1905, exhibiting a design similar to the W. R. HANNA*; note typical 2-mast, gaff-topsail rig, and sharp or "flat-iron" bow (C. P. Labadie Collection).*

A list of vessels lost at or near Kelleys Island, Ohio, was compiled (Table 5-5) from numerous sources (Mansfield 1899, Bowen 1952, Hamilton et al. 1966, Metzler 1978, Ackerman 1990, Douglas et al. 1994, Herdendorf 1999, Swayze 1999, Runge n.d., Wright n.d.). A methodical check of the known schooner losses in the area established that only the *W. R. HANNA*'s dimensions were a match to those of the North Bay scow wreck, and it seems a reasonable assumption that other vessels may consequently be ruled out. Newspaper accounts of the *W. R. HANNA*'s loss provide encouraging information, but did not confirmed the wreck's identity beyond a reasonable doubt. The late Kelleys Island historian, Captain Frank Hamilton, noted that the scow schooner *W. R. HANNA* had "foundered [and] pounded to pieces at Kelleys Island" in October 1886 with a cargo of stone, although no specific location was identified for the loss. A chart of western Lake Erie shipwrecks based on Hamilton's research shows the *W. R. HANNA* off the tip of Long Point, on Kelleys Island Shoal, several miles northeast of the North Bay wreck's location.

The *W. R. HANNA* was built in 1857 at Sandusky, Ohio by William R. Hanna for Jonathan Learned (sometimes spelled Larned), also of Sandusky. According to her official U.S. Customs enrollment documents, she was a single-decked scow schooner with two masts and a square bow and stern. She measured 86 ft (26 m) length, 22 ft (7 m) breadth of beam, and 6 ft (1.8 m) depth of hold. Her registered tonnage was $102^{6}/_{95}$ according to the old style of measure (in accordance with a Treasury Department regulation adopted in 1790) or 86.16 gross tons and 81.16 net tons (according to regulations adopted in 1864 and amended in 1881). She was assigned official number 26669. Her enrollments indicate that she changed hands several times, although it should be observed that the enrollment dates do not necessarily coincide with the dates of actual sale; rather, they reflect the dates when those transactions were registered with the U.S. Customs Department. It may be useful to note here, too, that "tonnage" as reflected in vessel enrollments does not mean weight, but rather a register ton refers to a measure of enclosed space. One register ton represents 100 ft^3 (30 m^3) of enclosed space in the ship's hull or superstructure. Inspection of enrollment documents yielded the following history of this vessel:

- July 23, 1857, Sandusky, Ohio. The *W. R. HANNA*, new, owned by Jonathan Learned, who was also the ship's master or captain.
- September 8, 1857, Sandusky; owned by Jonathan Learned and Rollin B. Hubbard of Sandusky, each one-half. Learned was still master.
- March 28, 1859, Sandusky; owned by Watson Hubbard of Sandusky; Jonathan Learned still master.
- April 10, 1865, Sandusky; *W. R. HANNA* "readmeasured" to conform with newly-adopted federal regulations. Her measurements according to the new system were 84.7x21.6x5.6 ft, and 86.16 gross tons. The name of her master (and former owner) is listed in this document as "J. Larned."
- June 5, 1868, Port Huron, Michigan; the vessel was sold to Henry and John Howard of Port Huron, each one-half; her master was Thomas A. Ellery.
- February 27, 1871, Port Huron, Michigan; the owners were unchanged, but her master is listed as A. H. Peer.
- April 13, 1875, Port Huron, Michigan; ownership transferred to Lawrence Sinclair of Port Huron, who was also her master.
- April 21, 1877, Port Huron, Michigan; ownership changed to Lawrence Sinclair and M. C. Brown of Port Huron, each one-half; Mr. Sinclair is listed as master.
- March 29, 1878, Port Huron, Michigan; owners changed to Henry Howard and Elizabeth Bedford of Port Huron; George H. Bedford, master
- May 5, 1881, Port Huron, Michigan; new owner is Horatio N. Jex of Port Huron, who is also master.
- May 15, 1882, Detroit, Michigan; a temporary enrollment indicated that the vessel was owned by L. J. Seek of Toledo, Ohio, "ice dealer"; her master was listed as Frank Provonsha. This document was succeeded by a permanent enrollment issued at Toledo, Ohio on January 2, 1885, confirming the same owner and master.

The vessel was removed from U.S. registry at the Toledo on June 30, 1888 with a notation that her official papers were lost when the vessel was wrecked, although no date for her loss was recorded at the time.

TABLE 5-5. LIST OF VESSELS LOST AT OR NEAR KELLEYS ISLAND, OHIO FROM 1837 TO 1922

1837 • Schooner *RAINBOW* sank NW of Kelleys Island (Aug)
1844 • Schooner *CLEVELAND* sank near Kelleys Island; stone cargo
1847 • Brig *UNCLE SAM* foundered E of Kelleys Island; lumber cargo (Dec)
1848 • Schooner *ASHTABULA* capsized near Kelleys Island (Jun)
1850 • Schooner *EMORY FLETCHER* sank at North Bay, Kelleys Island in gale; raised (Apr)
1852 • Brig *F. C. CLARK* wrecked near Middle Island (Nov)
1852 • Sidewheel steamer *ST. LOUIS* wrecked on Kelleys Island Shoal NE of Kelleys Island (Nov)
1853 • Schooner *GOVERNOR PORTER* sank near Kelleys Island; stone cargo
1854 • Schooner *HOME* sank W of Kelleys Island (Dec)
1854 • Schooner *FLORENCE* foundered off Kelleys Island (Dec)
1857 • Bark *EMPIRE* wrecked off Marblehead (May)
1861 • Scow *WILLIAM MATTHEWS* foundered at Kelleys Island
1867 • Scow *EAGLE* aground at Kelleys Island
1867 • Scow *FAIRY* reported ashore at Kelleys Island
1869 • Schooner *IRIS* aground at Kelleys Island
1870 • Schooner *MARY ANN* wrecked off Marblehead; stone cargo (Jun)
1871 • Schooner *VERNIE M. BLAKE* sank at Kelleys Island
1872 • Schooner *LOUIS McLANE* foundered at anchor N of Marblehead (Aug)
1872 • Schooner *ERIE* foundered at anchor off Marblehead (Sep)
1874 • Schooner *EXCHANGE* sank S of Kelleys Island; stone cargo (Nov)
1875 • Schooner *CONSUELO* foundered off Marblehead; raised (May)
1875 • Scow *MAYFLOWER* sank off Kelleys Island; limestone cargo; recovered (Aug)
1877 • Scow *GRAND ARMY* capsized near Kelleys Island (Jul)
1879 • Scow *JOHN A. SAUNDERS* stranded off Marblehead; stone cargo (Nov)
1880 • Scow *UNCLE SAM* stranded off Kelleys Island
1881 • Schooner *Q. A. GILLMORE* wrecked on Gull Island Shoal (Jun)
1882 • Schooner *OAK VALLEY* sank W of Kelleys Island
1882 • Schooner *GALLATIN* struck bottom & floundered N of Middle Island (Apr)
1883 • Schooner *H. P. BALDWIN* sank at Kelleys Island; stone cargo
1884 • Tug *RELIEF* burned & beached on Carpenter Point, Kelleys Island (Jul)
1884 • Schooner *KING SISTERS* stranded & broke up on Gull Island Shoal (Oct)
1886 • Scow *L. B. CROCKER* stranded at Carpenter Point, Kelleys Island (Sep)
1886 • Schooner *STAR OF HOPE* stranded & broke up off Kelleys Island (Oct)
1886 • Scow *W. R. HANNA* foundered & pounded to pieces at Kelleys Island; stone cargo (Oct)
1888 • Schooner *C. H. PLUMMER* burned & sank S of Kelleys Island (Nov)
1894 • Schooner *H. D. ROOT* sank W of Kelleys Island (Apr)
1902 • Steambarge *GEORGE DUNBAR* foundered ENE of Kelleys Island (Jun)
1902 • Schooner *AMARETTA MOSHER* stranded on Starve Island Reef; coal cargo (Nov)
1903 • Steambarge *ADVENTURE* burned & sank in North Bay; lime cargo (Oct)
1903 • Schooner *JOHN MARK* sank with stone S of Kelleys Island; recovered (Oct)
1905 • Barge *RACINE* sank at Kelleys Island; stone cargo
1906 • Schooner *WILLIAM CROSTHWAITE* sank SW of Kelleys Island; lumber cargo (Sep)
1906 • Barge *CONSTITUTION* sank near West Dock, Kelleys Island; stone cargo (Sep)
1911 • Scow *KEEPSAKE* stranded on Gull Island Shoal N of Kelleys Island (Aug)
1911 • Steamer *F. H. PRINCE* aground & burned E of Kelleys Island (Aug)
1916 • Steamer *ISABELLA J. BOYCE* aground & burned on East Point Reef off Middle Bass Island (Jun)
1922 • Barge *JOHN J. BARLUM* foundered SE of Kelleys Island (Sep)

The failure to terminate her enrollment in the fall of 1886 may indicate the intention of her owners to salvage the vessel, although no evidence of salvage attempts has yet been found in local newspapers.

A violent storm swept across Lake Erie on October 14 and 15, 1886, taking a heavy toll among the ships. Several substantial schooners were destroyed. The schooner *ST. JOSEPH* grounded at Fish Point, Pelee Island; the *SEA LARK* stranded on Pelee Island; the *O. M. BOND* was driven ashore at Rondeau on the Canadian shore; the *NEVADA* was beached at Ashtabula, Ohio; the *BELLE MITCHELL* foundered southwest of Long Point (with all hands); and the *GEORGE M. CASE* went down off Port Colborne. Several barges in tow of the steamer *PASSAIC* were badly damaged and nearly lost. All were victims of a gale-force wind that rose in the south and shifted to the west on the night of the October 14th. Northern Ohio newspapers (Sandusky, Cleveland, and Toledo) described the severity and the tragic aftermath of the storm:

- "Toledo, Oct. 14 – The storm today struck Toledo about noon, and from that until three o'clock, the velocity of the wind was about forty-five miles per hour. There was considerable damage done in a small way, blowing down chimneys, breaking in show windows, unroofing buildings, blowing down telegraph and telephone lines and overturning shade trees. No casualties. Reports from north-western Ohio bring tidings of similar damages…" (*Sandusky Daily Register*, October 15, 1886)

- "Buffalo, Oct. 14 – A terrific gale accompanied by rain set in here this afternoon and continues with increasing fury. At midnight the wind is blowing at the rate of 65 miles per hour. 'The Island' inhabited by squatters is flooded and water is rushing in huge waves over it. Twenty-nine houses have been totally destroyed and over 100 persons are homeless. The wife and daughter of Charles Lambert were drowned and several others are reported missing. The basements of all houses on Canal Street are flooded and the Western Transportation [ware] house was blown down, causing a blockade of the Lackawanna tracks. Michigan and Main streets are flooded 700 feet from the dock and Ohio Street is completely flooded. All the lumber yards on the island are wrecked. The damage to shipping is very great. Barges are floating over Evans' dock and a number are reported smashed. At 8 this evening the rear wall of the new music hall went down with a crash. No one was injured." (*Sandusky Daily Register*, October 15, 1886)

- "LAKE AND HARBOR [Sandusky] – There were no arrivals or departures in marine circles yesterday on account of the storm…The *JAY COOKE* came in from Put-in-Bay but reported a stormy passage, and they would not venture to return, and remained at her dock. The [*R. B.*] *HAYES* was an hour getting over from Fox's dock and would not venture out again. The [*AMERICAN*] *EAGLE* started out in the afternoon, but did not go far before she gave up and returned. The [*B. F.*] *FERRIS* also gave up and stayed in…The Bay was in a turbulent condition all day, and outside the waves were said to be mountain high. There are a number of vessels at the B & O dock, but none of them ventured out, although some are ready to sail…A pound boat capsized near Kelley's Island yesterday morning, but as far as could be learned there was no damage except a good wetting to those in the boat." (*Sandusky Daily Register*, October 16, 1886)

- "BLOW YE WINDS—A POWERFUL SOUTHWESTER STIRS UP THE ELEMENTS—About 4 o'clock yesterday morning a gentle breeze sprang up from the southwest which gradually increased until by ten o'clock a semi-tornado accompanied by heavy rain was making things lively in this vicinity. The wind continued with unabated fury all day and into the night, but about two o'clock this morning began to abate and gradually died down to its normal velocity…Inquiry at the Signal Station showed that during the day the wind registered the frightful velocity of 53 miles per hour, which is considered very near a hurricane...This has probably been one of the heaviest gales that has visited these parts in a number of years." (*Sandusky Daily Register*, October 16, 1886)

- "The scow *HURON* [sic] is reported aground on Kelley's Island…The water was reported to be down three feet below normal Thursday evening." (*Sandusky Daily Register*, October 16, 1886)

- "THE MOST SEVERE GALE FOR YEARS – Port Colborne, Ont., Oct. 15. – The gale yesterday was

the hardest blow experienced here for years. Water was raised some eight feet in the harbor and the current into the canal was equal to Niagara's river. The wind was principally from the southwest and continued until midnight, when it shifted to the westward and moderated. This morning it was still blowing strong from the west. About four hundred feet of the west pier was washed away. The schooner *HARTFORD* from Detroit arrived here all safe about 4 o'clock this morning. The captain says the sea was something terrible, washing clear over the vessel and filling the cabin, but the boat sustained no serious damage…" (*Cleveland Plain Dealer*, October 17, 1886)

- "The scow *W. R. HANNA*, owned [sic] by Capt. Frank Provonsha of this city, went ashore during the recent great storm on Kelley's Island, and was pounded to pieces. She is a total loss. She was partly loaded with stone for Detroit at the time. The *HANNA* was valued at $1,000. No insurance." (*Toledo Blade,* October 30, 1886)

The reference to the scow "*HURON*" in the *Sandusky Daily Register* of October 15 was probably an error, and that the vessel in difficulty was in fact, the *W. R. HANNA*. No scow *HURON* is known to have been in service at that date.

ARCHAEOLOGICAL DOCUMENTATION

Underwater measurements were made in U.S. Customary Units and are thus reported here rather than conversion to Metric (SI) Units. The "position" numbers refer to location on the baseline (Figure 5-16). The vessel measures approximately 83.5 ft length and 20 ft width. The wreck lies in 10-12 ft of water on a sand bottom, approximately 50 ft southeast of the *ADVENTURE* Site and 300 ft from shore. The keel was oriented on a compass heading of approximately 20° (NNE). At least one-half of the site is buried under the quarry stone which had been the ship's cargo.

Vessel Characteristics. The ship's backbone assembly consists of a keel, 2 assistant keelsons, and 2 rider keelsons; all white oak, fastened with $^3/_4$-in iron treenails. The keel and riders are pierced just forward of amidships by a centerboard trunk approximately 24 ft long. The keel measures 14x14 in cross-section for most of its length, but it is moulded 14 in and sided 10 in at the after end. Outboard or "floor" keelsons, 5 on either side of the keel, are moulded 8 in and sided 6 in; these appear to have been fir rather than oak. In most large commercial ships oak was used for framing members, while white pine was used for deck beams, cabins, and masts (Hall 1880:138). The spacing between keelsons averages 16 in, but it varies because the keelsons are lap-jointed rather than scarphed, causing doubling up at some locations. The configuration and dimension of chine-logs proved difficult to establish, since these features are not intact at any location, and where they do survive, they are largely buried in the ship's cargo. The arrangement of the chine-logs is of great interest, since they are essential to an understanding of the framing scheme employed in this vessel type. A careful examination of this feature indicates that they are sided 6 in and moulded 9 in, fixed to side and bottom planking with treenails of $^3/_4$-in diameter. Since so little of the ship's sides are preserved, it was not possible to determine how the vertical framing in the sides was fixed to the chine-logs, although it is clear that the ship was fitted with light frames between inner and outer planking, and not the thick edge-bolted sides characteristic of "gunwale-built" scows. No rabbets or mortises were seen in the chine-logs to indicate the dimension or spacing of the vertical frames, but a uniform spacing between inner and outer planking indicates a moulded dimension of 6 in.

Planking is approximately 2 in thick inside and out, averaging 10 in width. Fastenings are $^3/_8$-in square nails. Bottom planking near the bow averages only 6 in width while the remainder of the bottom planking averages 10 in. It seems likely that the wider planking is a part of the original fabric of the ship, while the narrower pieces at the forward end probably represent repairs. Hull damage resulting from groundings would logically occur at the ship's bow, thus it is reasonable to assume that the discrepancy in planking characteristics was a result of routine repairs during the ship's 29 years of service. The outer planks appear to be white oak throughout, whereas the ceiling seem to be 2-in fir, except for the occasional $2^1/_2$- to 3-in oak ceiling plank, evidently introduced for strength at key locations. Not enough of the ceiling is exposed to determine the arrangement of these thicker planks in the hold, but one such plank was seen near the 56-ft mark on the baseline, perhaps marking the location of some feature such as a hatch opening or the ship's main

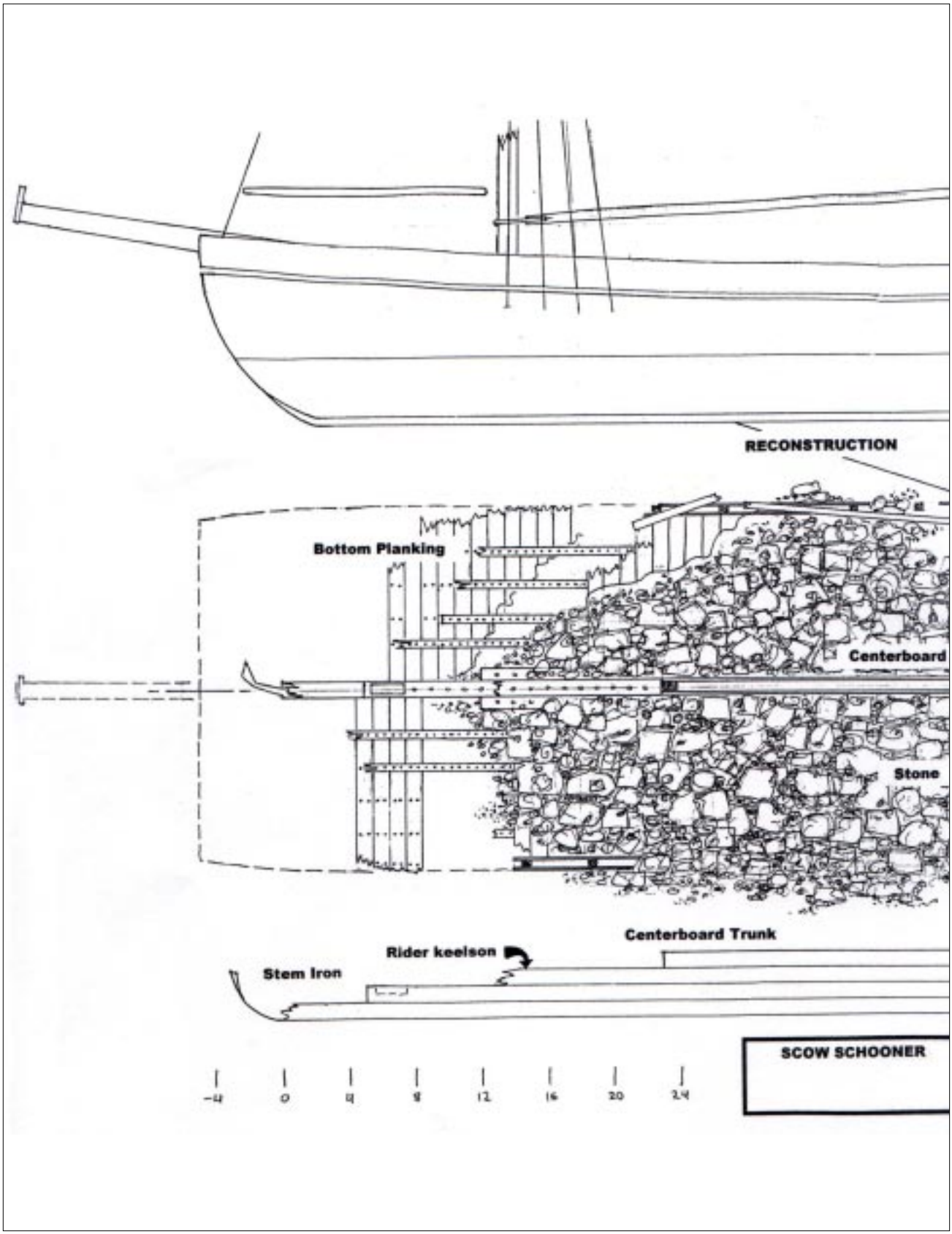

Figure 5-16. Site plan of scow schooner W. R. HANNA *(Labadie and Herdendorf 1999).*

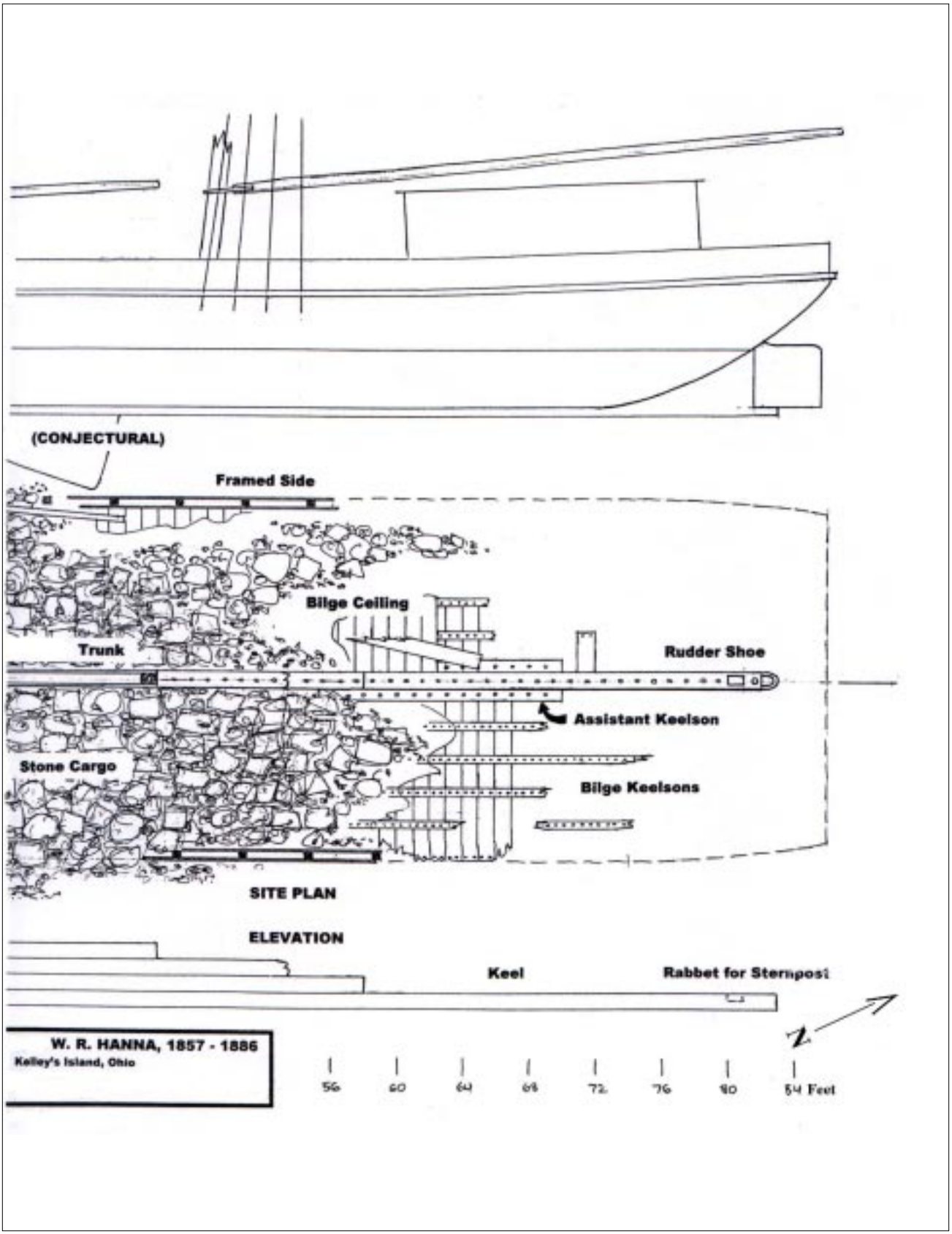

Figure 5-16. CONTINUED.

mast. No elements of the ship's decks, beams, or upper works have survived, perhaps because they were fabricated of fir, but undoubtedly because they were also exposed to sunlight, wave action, and ice movement nearer the lake's surface.

No elements of the ship's rigging were found at the site. The size of the vessel suggests that it was a two-masted schooner, although the mast steps were not positively identified in the surviving rider keelsons. Their positions would be of interest. Short oak bolsters were found on either side of the keelsons near the bow (from position 5 to position 8), perhaps indicating the location of the forward mast step, although this could not be corroborated by any other evidence. A single iron "chain plate" or strap was discovered during the 1997 field work, lying along the Kelleys Island shore several hundred feet west of the location of the wreck. This distinctive fastening for the mast shrouds cannot be positively associated with the scow wreck, but its size and crude manufacture strongly suggest that possibility; it appears to be too small for the nearby *ADVENTURE*. The chain plate measures $^1/_2$ in thickness, $2^1/_2$ in width, and 63 in length; one end is rolled into a loop for the strop of a wooden "deadeye." The total absence of iron shrouds, fittings, or rigging tools indicates that the scow may have been hemp-rigged. Iron wire for ship rigging was common by 1870, and its absence may suggest a vessel of pre-Civil War construction, although modest vessels like scow schooners were not always equipped with the costly English-made cable even decades later (Martin 1990b:8,9).

Relatively few artifacts were found in association with the ship, although several elements of a cast-iron cook stove were observed about 20 ft off the starboard side and others on the same side near the stern. A few nondescript iron fittings and clay pot-shards were discovered lying in the wreckage, plus the broken remains of a one-gallon clay jug and a perfectly-preserved drawknife. No thorough search was made of the area surrounding the wreck, but the excavation of shallow test holes suggests that a significant body of artifacts may lie buried in the sand. Toledo area sports divers produced a collection of artifacts reportedly removed from the site many years ago, including woodworking tools and personal effects. Among them were a variety of hammers, files, twist drills and ship augers, an adz, a slick, a large jug, and a high-topped leather shoe. All of these artifacts are suggestive of mid-to-late 19th century manufacture. Some of the tools have manufacturer's marks, but none have yet been investigated. It is interesting to note that all of the tools are woodworking tools rather than boatswain's tools or rigging hardware. No tackle blocks, rigging wire, shackles, or splicing tools were discovered. Aside of the fact that all sailing craft carried some boatswain's stores, this is also a strong indication that the scow was rope-rigged rather than the wire-rigging which had become commonplace long before 1886.

Cargo. The *W. R. HANNA* was one of dozens of steam and sailing vessels that serviced the limestone industry of Kelleys Island in the late 1800s (Figure 5-17). The final cargo of medium-sized dimension stone is believed to have been destined for Detroit (*Toledo Blade,* October 30, 1886). In June 1999, an attempt was made to estimate the size of the cargo by direct measurement of randomly selected blocks. The limestone blocks, mostly rectangular in shape, occupy most of the central portion of the site, from baseline position 9 ft to position 74 ft, with most of the concentration between 15 and 65 ft. A total of 27 blocks were measured for length, width, and thickness (Table 5-6).

The stone cargo covers an area of approximately 1,060 ft^2 (average stone = 1.5 ft^2) and ranges from 1 to 4 stones deep (average 2.5 stones), which gives an average thickness of 1.4 ft. These approximations yield an estimated total of 1,700 limestone blocks, which occupy 1,500 ft^3, for a total weight of about 253,000 lb or 126.5 tons. The intended purpose of the stone is unknown, but the size of the blocks is consistent with the material that was being used for harbor and breakwater structures in the late 1800s, particularly the size of the stone that was used to fill timber cribs.

Summary. The transport of limestone and lime products contributed greatly to the early commercial traffic on the Great Lakes and has traditionally ranked among the top five commodities in shipping tonnage. Initially, much stone, well adapted to building purposes was shipped from Kelleys Island (Ver Steeg and Yunck 1935:433). In the period immediately following the sinking of the *W. R. HANNA*, the island quarry operators concentrated on burned lime and crushed flux stone which was shipped throughout the Great Lakes region on vessels such as the steambarge *ADVENTURE*.

Besides the sizeable mound of stone cargo, measuring approximately 30 by 60 ft, the principal features of the wreck consist of the centerline keel assembly, several keelsons on each side, most of the ship's bottom planking, and some lower portions of the sides. There are also remnants of the inner planking or "ceiling" and a scattering of artifacts. There were no clues found regarding the circumstances of the vessel's loss.

TABLE 5-6. MEASUREMENTS OF LIMESTONE CARGO ON THE WRECK OF THE *W. R. HANNA*

Artifact No.	Baseline [1] Position (ft)	Length (in)	Width (in)	Thickness (in)	Shape of Stone Block	Volume (ft^3)	Weight [2] (lb)
H- 1	9	18	15	8	Rectangular	1.25	210.6
H- 2	10	25	20	7	Rectangular	2.03	342.0
H- 3	11	14	12	4	Rectangular	0.39	65.7
H- 4	12	20	12	7	Rectangular	0.97	163.4
H- 5	14	20	14	6	Rectangular	0.97	163.4
H- 6	20	12	6	6	Triangular	0.25	42.1
H- 7	24	15	10	6	Rectangular	0.52	87.6
H- 8	26	14	11	6	Rectangular	0.53	89.3
H- 9	27	31	14	6	Triangular	0.75	126.4
H-10	30	14	13	6	Rectangular	0.63	106.1
H-11	31	22	14	6	Rectangular	1.07	180.3
H-12	32	12	9	6	Rectangular	0.38	64.0
H-13	34	18	12	7	Rectangular	0.88	148.3
H-14	38	20	14	6	Rectangular	0.97	163.4
H-15	39	19	12	7	Rectangular	0.92	155.0
H-16	40	18	15	6	Rectangular	0.94	158.4
H-17	41	19	12	9	Rectangular	1.19	200.5
H-18	49	9	8	8	Rectangular	0.33	55.6
H-19	50	22	14	9	Rectangular	1.60	269.6
H-20	51	12	12	9	Rectangular	0.75	126.4
H-21	55	15	12	6	Triangular	0.73	123.0
H-22	57	15	12	7	Rectangular	0.91	153.6
H-23	58	15	14	9	Rectangular	1.09	183.6
H-24	59	11	7	5	Rectangular	0.22	37.1
H-25	61	22	21	7	Rectangular	1.87	315.1
H-26	68	16	15	7	Rectangular	0.97	163.4
H-27	74	19	11	3	Rectangular	0.36	60.7
Mean		17.3	12.6	6.6		0.87	146.5

Notes:

1. Baseline oriented toward the northeast, starting at the bow.
2. Weight based on a specific gravity of limestone ($CaCO_3$) at 2.7 (1,728 in^3 = 1 ft^3 = 168.5 lb of stone).

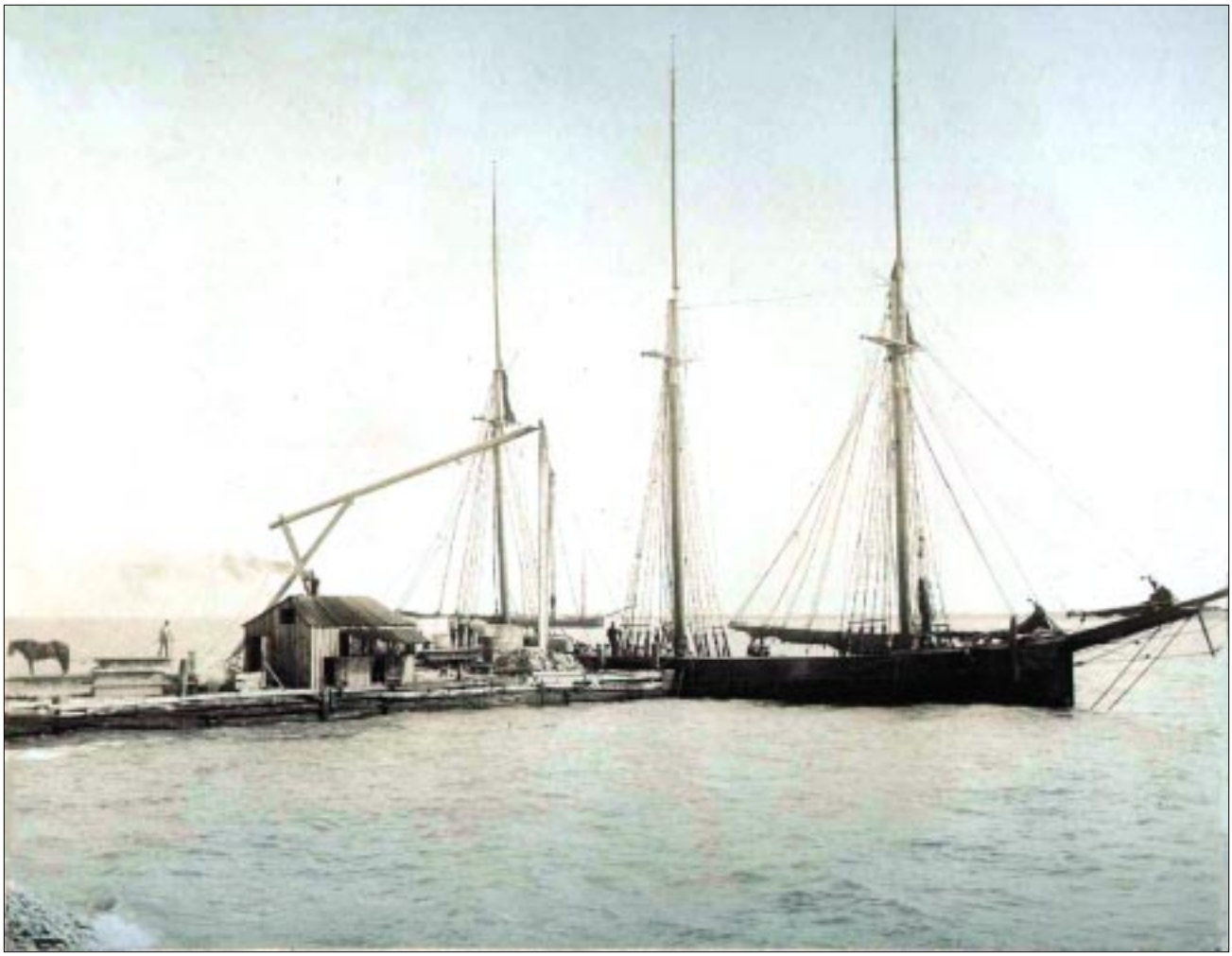

Figure 5-17. The H. G. CLEVELAND*, a 3-masted, 132-ft-long schooner, loading large blocks of dimension stone at the south dock of Kelleys Island, ca. 1875 (courtesy of Georgann and Michael Wachter). On the evening of August 12, 1899 the* H. G. CLEVELAND *departed Kelleys Island with 515 tons of flux stone taken from the island's quarries and bound for the steel mills of Cleveland. Approaching Cleveland Harbor, the 32-year-old schooner developed a leak. Despite desperate efforts by the crew to pump water from the hold and an attempt by the tug* MATHAM *to tow her safely to harbor, at 7:00 A.M. on August 13th, her decks swamped and she sank in 55 ft of water about 4 miles off Lakewood, Ohio. Her crew, sensing the final demise, lept to the tug just as the schooner disappeared. Her stone cargo can still be seen on the lakefloor pierced by her massive centerboard.*